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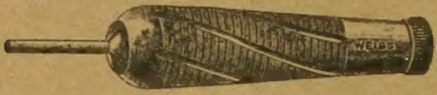

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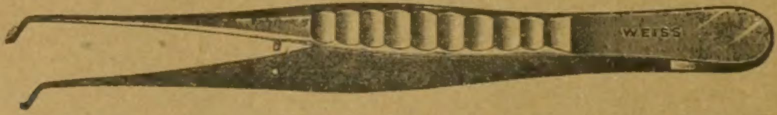

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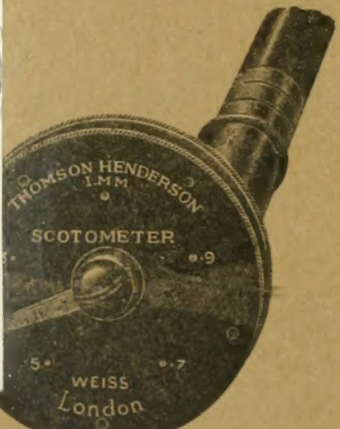

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ORIGINAL COMMUNICATIONS.

THE ÆTIOLOGY OF GLAUCOMA.

BY
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Introduction.

A PERUSAL of the modern literature on the ætiology of glaucoma is suggestive of a mental kaleidoscope, in which outstanding and not infrequently discordant data are viewed from innumerable angles. At first sight the picture seems attractive, and one which satisfies the casual observer. When, however, he endeavours to get at close quarters with the subject, he finds that it bristles with difficulties. The more he studies it, the more dissatisfied he is likely to become with the present state of our knowledge. The reasons for this would appear to be manifold.—(1) Some of our principal data do not rest on a basis of universal acceptation, but still remain the arenas of vigorous dispute. (2) Few, if any eyes are submitted to a microscopic examination at a very early stage of the disease; most, if not all, of our material is from globes far advanced in glaucoma, an exceedingly large percentage being taken from blind painful eyeballs. In such material the tissue changes, which are causative of glaucoma, are obscured and overlaid by those, which are consequent upon the morbid processes that have been at work. Under these circumstances, it is impossible to distinguish with certainty between cause and effect, and yet, we not infrequently see articles in which these considerations are overlooked, with the result that dire confusion exists in the mind of the writer and is spread to some at least of his readers. (3) There is a widely existent confusion between the ætiology, the pathogeny, and the pathological anatomy of the disease. It is true that this confusion is not peculiar to the study of glaucoma, but it is markedly accentuated in this disease, owing to the reasons mentioned in our two previous headings. An attempt to seek more precise definition in our terminology appears likely to be of benefit, and will therefore be attempted. *Pathology* has been defined* as "that part of medicine which explains the nature of diseases, their causes and symptoms." A more restricted meaning is given to the term by those who would understand by it merely the study of pathological anatomy. To avoid ambiguity, however, it will be better always to speak of this branch as *pathological anatomy*. *Pathogeny* is defined* as "the science of the generation and development of disease," whilst *ætiology** is "an account of the causes of disease." It is fatal to clear thinking to confuse these three. We cannot start, as we would like to do, from the teachings of the pathological anatomy of glaucoma, to reason out either its ætiology or its pathogeny. If we do so in the present state of our knowledge, we shall be in danger of building on sand. Our study of the pathogeny of the disease must necessarily be a clinical one, whilst our views on its ætiology have been based on clinical observation, tempered by a study of the changes produced both in the eye and in the organism by those conditions of life which our observations lead us to believe are causative of the disease. (4) There is a subsidiary element of confusion which it will be convenient to to discuss here. Some writers in speaking of the causes of glaucoma, include under this heading anatomical changes, such as the continued growth of the lens throughout life, or the fibrosis of the pectinate ligament. The question may fairly be raised as to whether these are causes of glaucoma. Do not the causes of glaucoma lie further back in the advance of age, and in those degenerative processes which are inseparable from the wear and tear of a living organism? It is a nice point and one which is of comparatively little importance, provided that we clearly recognise the true position of affairs; but to draw up a list of the causes of glaucoma, and to include in that list the anatomical changes produced by antecedent degeneration or disease, side by side with the names of those diseases or degenerations, is illogical in theory and confusing in practice. (5) The term "Glaucoma" is not the title of a single disease. It is rather a convenient clinical label for a large group of conditions, the distinctive class feature of which is that of a rise in the intra-ocular pressure. The ætiology differs widely in different cases; the pathological anatomy of the globes, when they come to dissection, show no less variation; whilst the difference in the symptoms which are presented is so great, that it would be difficult without careful study, to recognise the strong bond that has served to unite all these cases in a common category. That bond, we repeat, is the rise in intra-ocular pressure. To this rise all causes lead up. Once it is established, be its source what it may, every sign and symptom we meet with in glaucoma finds a ready explanation; whilst the variation in different types of the disease is explained with equal facility by the interplay of those anatomical and pathological conditions which vary so widely in different eyes, and which thereby profoundly influence the rate in the rise of the intra-ocular pressure in any individual case. Once such a rise is established, it dominates the whole of the picture from a clinical point of view. Indeed, it not seldom does so to the exclusion of a just consideration of the ætiological factors of the situation. It is necessary, then, to keep clearly in mind that in dealing with cases of glaucoma, all causes of the condition, however diverse they may be, lead up to the one central feature of a rise in the pressure within the eye. On the other hand, every characteristic sign and symptom of the disease can be traced back to this same central feature. A rise in the tension of the eye is the hub of the glaucoma wheel. To alter the metaphor, it is the junction through which all lines must pass, whether of ætiology or of clinical course. We must not allow this to blind us to the fact already stated that glaucoma is not a disease, but a collection of widely different pathological conditions.

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* Annandale's Dictionary, Blackie & Son, Ltd., 1901.

All the different factors, which from time to time have been cited as causes of glaucoma, may ultimately be classified under one or other of two headings:—(1) those which influence the balance of secretion and excretion of the intra-ocular fluid, and (2) those which directly or indirectly determine a change in the vascular conditions prevailing within the eye.

To this statement we shall on more than one occasion have to return. There is no single assertion in connection with the pathology of glaucoma which equals it in importance. Before, however, we address ourselves to the serious study of the ætiology of the disease, we must first learn all that pathological anatomy has to teach us, and this despite the fact, already stated, that anatomical data alone would furnish a very insecure foundation for the superstructure we desire to raise.

The Pathological Anatomy of Glaucoma.

Much that has been written in the past on the pathological anatomy of glaucoma has now merely an historic interest. For this, faulty observation and premature deductions have been largely responsible. Cause and effect have been confused; an undue influence has been ascribed to conditions which have been found to be present; and imagination has not infrequently been allowed a quite undue license.

We shall take up in turn the more interesting observations which have been made, and discuss their present status in the light of recent knowledge. In doing so, it will be convenient to start with those which can be most easily dismissed, and to pass gradually up to those which now seem to be most worthy of attention.

Changes in the vortex veins.

Birnbacher and Czermak[1] found extensive changes both in and around the vortex veins in glaucomatous eyes. The vessels, the lymph spaces surrounding them, and the sclera in the neighbourhood showed extensive cellular infiltration, whilst the endothelium of the veins had undergone great proliferation. It was argued that such changes would obstruct the flow through these veins, lead to congestion of the areas drained by them, and thus bring about a rise in the intra-ocular pressure. An air of probability was lent to the suggestion by the fact that various observers had found that ligature of the venæ vorticosæ in animals led to a very marked increase of the intra-ocular pressure. Probably, the most interesting work on the subject is that of Koster[2], who, after summarising the results of those who had preceded him, gave his own findings.—When all four veins were ligatured, very high tension immediately came on; the pupil dilated, the anterior chamber became shallow, especially at its periphery; the iris vessels filled with blood; and a marked swelling of the ciliary body could (in albino rabbits) be readily seen with the ophthalmoscope. Three weeks later, the eyes appeared normal, except that the periphery of the iris remained adherent to the margin of the cornea. When two or three, instead of all four, of the vorticose vessels were ligatured, the iris thickened and came forward *only in the region corresponding with the ligatured vessels*; and it could be observed that *the ciliary body was swollen in the same region and not elsewhere*. The degree of glaucoma was much milder than in the earlier quoted experiments.

It cannot be denied that these observations are full of suggestive interest, but they have been robbed of much of their force by A. W. Stirling[3], who has shown that so far from the changes described by the Austrian observers being constantly met with in glaucoma, they are in reality very rare indeed.

The statement has also been made that appearances, precisely similar to those recorded by Birnbacher and Czermak, are to be seen in eyes which are free from all suspicion of high tension. It is, however, hard to trace the authority for this assertion.

Heerfordt[4] went a step further than any one had done before, and suggested, on very insufficient evidence, that acute glaucoma was due to an obstruction to the intra-ocular circulation, located in the sinuses which give origin to the vortex veins. The idea seems an extravagant one.

It would be rash to assert that obstruction to these large veins might not, in some cases at least, be a determining factor in the onset of a glaucoma, for which other changes had possibly prepared the way; but it would be safe to say that modern ophthalmological opinion does not lay any very serious stress on the *rôle* of the changes we have been discussing.

REFERENCES.

1. **Birnbacher and Czermak.**—*Archiv für Ophthalmologie*, Vol. XXXII, part ii, 1886, and "Ein Beitrag zur Anat. d. Glaucoma Acutum." Graz, 1890.
2. **Koster, W.**—Von Graefe's *Archiv*, 1895, Vol. XLI, part ii, p. 30.
3. **Stirling.**—*Royal London Ophthalmic Hospital Reports*, Vol. XIII, 1893, p. 419.
4. **Heerfordt.**—*Ophth. Review*, Vol. XXX, p. 196.

Disease of the Vessels as a cause of Glaucoma.

From the earliest days, a number of observations have been placed on record as to œdematous and vascular conditions seen in the posterior pole of the eye, and it has been suggested that these might stand in a causal relation to the rise in tension. Such suggestions still crop up sporadically, as for instance, in a quite recent communication in a leading ophthalmic journal, in which the writer,[1] on the strength of the various evidences of venous congestion which are so familiar in glaucoma, suggests that it is "a vascular disease." He, however, fails to bring forward any fresh evidence on the subject. There are few conditions in which cause and effect are more easily confused than in glaucoma, but surgical opinion has long decided that all the evidences of vascular disturbance, on which he lays so much stress, find a ready explanation in the *results* of an increase of intra-ocular pressure. It is extremely unlikely that this verdict will ever be seriously questioned, unless some new and cogent facts are brought forward for the purpose. Mere speculation will certainly carry little, if any, weight. Nothing that has been here said is to be taken as affecting the *rôle* of venous congestion in determining a rise in intra-ocular pressure, or that of the interplay between the vascular factors and those which control the relationship between secretion and excretion of the aqueous fluid.

REFERENCE.

[1] **Fergus, Freeland.**—*Ophth. Rev.*, May, 1915, p. 135.

Schnabel's Cavernous Atrophy of the Optic Nerve.

In the year 1892, **Schnabel**[1] advanced the view that the cupping of the glaucomatous disc was due, not to an increase of the intra-ocular pressure, but to an "active atrophy" of the nerve itself. He considered that the lamina cribrosa was not pushed back by pressure from within, but that it was pulled back from without by the shrinking of the wasting nerve. In that part of the nerve, which lay within the scleral canal, he observed the presence of microscopic holes, which by enlargement and coalescence, led to the formation of what he described as a "cavernous degeneration." As the morbid process progressed, the spaces became larger, until at last a single huge cavity—the cupped disc—was left. In association with these changes, there was a proliferation of vascularised connective tissue, which subsequently shrank and became more condensed. Other writers have confirmed Schnabel's observations, so far as they concern the existence of a cavernous degeneration, in a limited number of cases of glaucomatous cupping, and have described septum-like projections into the floor of the cup in some of these. The latter appearances evidently represent the partitions between neighbouring "caverns," at a very late stage of their coalescence.

It was not very long, however, before two facts appeared to emerge in an unmistakable manner from the increasing mass of observations which were laid before ophthalmologists, *viz.*, (1) that cavernous degeneration of the optic nerve is met with in eyes which have never been subject to an increase in internal pressure, and (2) that no signs of it are to be found in many, if not in most, glaucomatous globes. This matter was practically thrashed out in a discussion on a paper read by Schnabel[2] in Vienna in 1908. His most interesting points were:—(1) that where an increase of tension was absent, the lamina cribrosa was not displaced, and (2) that a progressive cavernous atrophy might occur after the completely successful reduction of a rise in ocular tension by means of an iridectomy. These propositions were admitted by the Meeting, and ratified later by ophthalmological opinion, but his consequent contention that glaucomatous cupping was not due to an increase of intra-ocular pressure, was rejected then, and has never since come into favour. The most important item of evidence against such a view, is to be found in the behaviour of the glaucoma cup, in certain cases, after a successful reduction of ocular tension by means of a filtering operation (successful iridectomy being included in this category). Holth[3] has dealt in a very interesting manner with this subject. He has shown that von Graefe was the first to observe a transitory levelling of a glaucoma cup, after the performance of a successful iridectomy. Since then, others also have noticed the same phenomenon, whilst to Axenfeld belongs the credit of having drawn attention prominently to the subject in recent times. Holth has repeatedly seen complete and *permanent* disappearance of the glaucomatous excavation after successful filtration operations. Axenfeld has had a similar experience, and many other surgeons have since confirmed the observation in their own practice. Nor is the evidence merely ophthalmoscopic, for Holth has established his clinical findings on the subject by the anatomical examination of eyes which had been successfully sclerectomised.

Lange,[4] too, has made some very interesting observations in this connection. He has seen a diminution in the depth of glaucoma cups, not only after operation, but also after the use of myotics. In one case the depth of the cupping varied from time to time with the changes in the tension of the eye. The writer has seen a somewhat similar case. It is the rule to find, that after the performance of a successful filtration operation undertaken for the relief of tension, the visual acuity ceases to fall; indeed, in a certain percentage of cases, a more or less decided rise in vision is met with. At the same time the fields may be expected to enlarge; sometimes, indeed, to a very considerable extent. These changes for the better are independent of any diminution in the depth of the cupping of the disc. It is, however, equally beyond dispute that in a definite, but fortunately small, proportion of cases, the optic atrophy, and the resultant affection of vision, continue to progress, despite the most ample relief of tension. Indeed, this may occur even in cases in which the depth of cupping shows decided diminution, as a result of the lowering of the intra-ocular pressure. Such instances have been made much of, and seen in an altogether false perspective by some surgeons, whilst they have been ignored by others. It is true that they are but seldom met with, but they do occur, and this fact demands an explanation. To assume on that basis, as has been done, that operations which lower the pressure within the eye are useless, or that an increase of intra-ocular pressure is not the paramount feature of glaucoma cases, is futile. Schnabel was led astray when he advanced the view that the cupping of the disc was the result of essential changes in the nerve, apart altogether from pressure. The cupping of the disc met with in glaucoma is the direct result of an increase of intra-ocular pressure. His theory was an extravagant one, but the work he did was of great value for this reason, if for no other, that it drew attention to these cases of the continuance of atrophy of the nerve, after the prime cause of that atrophy had been removed. To explain the phenomenon in question, we may tentatively put forward several possible suggestions:—(1) that in these cases, the trouble from the first is an atrophy of the nerve, quite independent of pressure (what has been called an "essential atrophy,") and that the anatomical change is of the cavernous type; (2) that the two conditions, *viz.*, atrophy from pressure, associated with cupping, and some form of primary (or essential) atrophy occur together, as the result of accidental circumstances; it is conceivable that in the weakened condition of the nerve the excess of pressure required might be very slight; and (3) that the tendency to atrophy of the nerve is for some reason present in a latent form, and that it is enabled to assert itself, as a result of the injury the nerve has sustained in consequence of the pressure to which it has been subjected. It is possible that in different cases any one of these three may be the correct explanation, but the writer thinks that probably the last-named is most frequently the correct solution. This view will be best explained by a reference to a recent case in his own practice.—A patient was sent to him for consultation, in whom, in spite of a perfectly performed and successful trephining, the visual fields were steadily diminishing, and vision was failing; the tension of the eyes was distinctly below normal, and free filtration was taking place. A search for a source of auto-intoxication suggested more drastic dental attention than the patient had yet received. His teeth were all removed, with the result that the fields showed a very early increase in both eyes, and central vision at the same time improved. The explanation would appear to have been that the nerve had been so damaged by the glaucoma, that it was rendered unable to resist the attacks of the poison produced autogenetically in the pyorrhœic area. It is likely that other intoxications act in a similar manner. The lesson would appear to be, that when we find an atrophy of the optic nerves progressing in spite of the relief of tension by a suitable operation, we should search diligently for a source of autogenetic intoxication, and treat the same vigorously whenever it is found. If this be done, then Schnabel's work will have been of considerable value, even although we may reject his explanation of the phenomena he observed.

It remains to be added that Fleischer[5] believes (a) that Schnabel's cavernous excavation is an atrophy arising from infiltration of the nerve with lymph, and (b) that the presence of this fluid is caused by the circulatory stasis, associated with a marked rise in the tension of the eye. Fuchs[6] apparently holds somewhat similar views.

The latest work on the subject is that of Ischikawa,[7] who has examined ten glaucomatous eyes and found Schnabel's "caverns" in the five cases which were of recent origin, but not in the other five which were of longer standing; he believes that the "caverns" are characteristic of glaucoma, as Schnabel claimed they were, and that they form a specific class of disease of the optic nerve; this begins as an œdema of the nerve fibres, which later become dissolved and thus form the "caverns"; the glaucomatous excavation is due to the coalescence and subsequent disappearance of these "caverns"; the latter are not found in any other diseases, with the exception of high myopia, in which he attributes them to mechanical factors. It is one thing to postulate that the changes which accompany glaucoma are specific or semi-specific in character; it would be quite another to assume, as Schnabel erroneously did, that an increase of intra-ocular pressure was not concerned in their origin.

It seems not impossible that we have still much to learn on the subject, in spite of the fact that it has been freely canvassed by ophthalmologists for nearly a quarter of a century. Indeed, the lesson, when learnt, may prove to be both valuable and important.

REFERENCES.

1. **Schnabel.**—*Archiv f. Augenheilkunde*, Vol. XXIV, 1892, and *Wiener med. Woch.*, 1900.
2. **Schnabel.**—*Zeitschr. f. Augenheilkunde*, April and June, 1908.
3. **Holth.**—THE OPHTHALMOSCOPE, Vol. IX, p. 494 (1911), and Vol. XII, pp. 347-354 (1912).
4. **Lange.**—*Klin. Monastbl. f. Augenheilkunde*, Vol. L.
5. **Fleischer.**—*Thirty-eighth Ophthalmological Congress*, Heidelberg, p. 110.
6. **Fuchs.**—*Klin. Monatsbl. f. Augenheilkunde*, January, 1911.
7. **Ischikawa.**—*Archives of Ophthalmology*, Vol. LXXXVII, Part iii, p. 429, and *Archives of Ophthalmology*, Vol. XLIV, Part iii, p. 339.

Fibrosis of the Cribriform Ligament.

T. Henderson[1] has advanced the view that a structural change in the pectinate (or cribriform) ligament is responsible for an obstruction to the ready access of the aqueous fluid to Sclemm's canal. His main points are as follows :—

(1) The cribriform ligament is a continuation of the inner lamellæ of the cornea ; it is composed of regular and evenly-disposed interlacing fibres ; and it ends as the ligament of origin of the ciliary muscle.

(2) The angle of the anterior chamber has for its boundaries the cribriform ligament in front, and the iris root behind, the ciliary body being thus excluded from reaching the anterior chamber at all.

(3) The cribriform ligament is purely cellular at birth ; and undergoes increasing sclerosis as life advances, until, in old age, its fibres come to resemble those of the adjacent sclera.

(4) It is nothing more nor less than a regular and open network, formed of interlacing fibres, which are a direct continuation of the longitudinal and circular bundles of scleral fibres surrounding the venous sinus of Schlemm's canal.

(5) The spaces in the cribriform ligament are directly continuous with those between the corneal lamellæ, and the ligament is to be looked on simply as a very open part of the corneo-scleral envelope.

(6) The results of sclerosis of the ligament are : (a) to reduce the contrast between the cribriform ligament and the surrounding corneo-sclera to one of magnitudes of fibres only, and (b) to reduce the interspaces and alveoli of the retiform tissue. The thickness of the ligament itself, as it lies between the anterior chamber and Schlemm's canal, is unaffected.

(7) On anatomical grounds alone, a free communication is postulated, between the anterior chamber and the supra-choroidal space, along the posterior portion of the cribriform ligaments.

(8) The sclerosis of the ligament creates an increasing mechanical obstruction which predisposes to glaucoma by impeding the access of aqueous both to Schlemm's canal and to the venous channels traversing the supra-choroidal space.

(9) Again, solely on anatomical grounds, it is assumed that the action of the ciliary muscle in accommodation is to facilitate the escape of the aqueous into the supra-choroidal space, and thus to produce a physiological deepening of the anterior chamber.

It is one thing to admit that this sclerosis of the pectinate ligament may offer an obstacle to the free escape of aqueous from the eye, always provided that other conditions remain constant, and so may predispose the organ to a rise in tension. It is quite another thing to agree with Henderson that we have here the chief of the predisposing anatomical causes of glaucoma. According to his own showing, the fibrosis is universal ; on the other hand, we know that glaucoma is a not very common disease, although the tendency to it increases with age. We do not even find that the intra-ocular pressure rises with the advance of age, as we should expect it to do, if these fibrotic changes really oppose a constantly increasing resistance to the passage of aqueous from the eye. Moreover, as Priestley Smith has pointed out, Henderson's theory does not account for the shallowing of the anterior chamber met with in glaucoma, nor for the equally characteristic closure of the filtration angle. The danger of arguing a physiological problem on purely anatomical grounds is well recognised, and all that we can safely admit is that the sclerosis of the pectinate ligament (the existence of which has not, we believe, been disputed) may well be one of the predisposing causes of glaucoma, inasmuch as it may tend to upset the balance normally held between the secretion and excretion of fluid from the eye. To go further would be to outrun our facts.

The treatment of this subject would be incomplete without a reference to the valuable writings of Professor Arthur Thomson, of Oxford.[2] It is impossible to give more than a brief abstract of the principal parts of that section of his work which immediately affects the question at issue:—

(1) He evidently prefers to retain the time-honoured name of "the pectinate ligament"; there are obvious advantages in following his lead in this matter. (2) He describes this ligament as consisting of an open meshwork of fibro-elastic tissue, which can be traced forward into direct continuity with the homogeneous elastic layer of Descemet. If the latter membrane be traced backwards, it is found to break up into a number of fibrillæ, arranged in a brush-like fashion. Under meridional section, the appearance presented is that of the triangular area of trabecular tissue, long familiar to us as the pectinate ligament. Thomson is satisfied that the spaces within this tissue are lined by extensions from the layer of endothelial cells, which cover the posterior surface of Descemet's membrane. The majority of fibres of this ligament are attached to the front of the scleral process, whilst the meridional division of the ciliary muscle is inserted into the posterior surface of that spur. (3) By the aid of anatomical observation, assisted by admittedly rough experiments on dead eyes, he has evolved the theory, that the escape of fluid from the anterior chamber into the canal of Schlemm, and again from that vessel into the neighbouring veins, is the result of a pumping action, in which the muscles of the ciliary body and of the iris, draw back the scleral process and so open both the canal of Schlemm and the trabecular spaces of the pectinate ligament. Again, the elasticity of this ligament, and of the scleral spur itself, tends to close both the spaces and the canal, and so to drive the aqueous fluid onward into the surrounding veins. This is admittedly a deduction, and must be taken as such, but the excellence of Thomson's preparations, and of his photographs of them, as well as his reputation as an anatomist, carry a measure of conviction, which is materially strengthened by the fact that his arguments are as simple as his method of presenting them is lucid. Some of the work on this subject put forward in recent years has been so involved, and so difficult to understand, that it has tempted one to doubt whether the writers had really mastered the arguments they presented. It is refreshing to turn from such studies to the finished products of Arthur Thomson's pen. In the light of what he has written, whilst it is still conceivable that an encroachment on the trabecular spaces of the pectinate ligament may be an important factor, it seems still more likely that a want of elasticity in these thickened fibres may greatly mar the usefulness of the parts for the function which Thomson ascribes to them. In other words, the regular pump action, whose motive force is supplied by the muscles of the ciliary body and of the iris, may be

hampered both in contraction and in the subsequent rebound by any change which damages the extensibility and the elasticity of the pectinate ligament.

REFERENCES.

1. **Henderson, T.**—"Glaucoma." Arnold, London, 1910.
2. **Thomson, Arthur**.—THE OPHTHALMOSCOPE, Vol. VIII, 1910, pp. 608 *et seq.* *Ibid.*, Vol. IX, 1911, pp. 470 *et seq.* "The Anatomy of the Human Eye," Clarendon Press, Oxford, 1912.

The Hydrophyllic Theory of the Ætiology of Glaucoma.

The studies of Fischer[1] on the production of œdema by the action of acids or alkalies on the colloidal tissues of the body, led him to apply his conclusions to the explanation of the causation of glaucoma. According to him, this condition is an œdema of the eyeball, in which the amount of water held by the hydrophyllic colloids of the eye is increased. He did not distinguish between the individual structures, but thought the whole globe participated in the change. He believed that the most important causative factor of such an hydrophyllism was an increase in the amount of acid present in the organ, and that the recognised exciting causes of an attack of high tension were those which might be expected to lead to an abnormal production or accumulation of acid in the eye. Ruben,[2] who repeated the experiments, agreed with Fischer's main contentions, but found that the swelling under acidosis involved the sclera and cornea, but not the vitreous. He thought that in this way a shrinking of the intra-ocular capacity was brought about, and hence an increased pressure of the contents of the eye resulted. It would naturally suggest itself, that if such a swelling of the coats of the eye actually did occur, the efferent vascular channels would probably suffer more than the afferent, owing to their thinner walls, and that thus an obstruction to the escape of fluid and of venous blood from the eye might take place, which would be much more important than the mere reduction of intra-ocular contents, for the latter might be easily compensated, so long as the channels of fluid-escape remained open. It is of interest, in this connection, to recall the fact that Maynard,[3] in Calcutta, saw over twenty cases of glaucoma, associated with a wave of epidemic dropsy. The observation is suggestive. The obvious criticism of the view of the case presented by Fischer and by Ruben is (1) that in glaucoma we do not find evidence of that swelling of the ocular tunic which their theory demands; this subject has been considered by Ischreyt,[4] who carefully measured the thickness of the sclera in glaucomatous eyes; (2) that the strength of acid concentration with which they worked would not be found *in vivo* in the tissues; and (3) that it does not necessarily follow that a very much diluted acid will produce the same results, or even the same class of results, as a comparatively concentrated one. What is more, had they confined themselves to claiming that the swelling produced led to an obstruction to the efferent channels, it would still have been incumbent on them to bring forward anatomical evidence of such a change. Nor have they been more fortunate in the results of the treatment which has been based on their theory. Thomas[5] claimed that the tension of a glaucomatous eye could be reduced by the subconjunctival injection of a solution of sodium citrate. This therapy was founded on Fischer's finding that certain salts (amongst others, sodium citrate) have the power of preventing the absorption of water from acid solutions. He was supported by Sedwick[6] and Grandclément[7]; other surgeons have, however, been less fortunate in their results from this form of treatment. The majority of ophthalmologists have found that the remedy does *not* reduce the tension in glaucoma, and that it may even seriously aggravate it.

Quite recently, Scalinci[8] has championed Fischer's theory so far as "irritative glaucoma" is concerned. He adopts the view that the first stage in this affection is an œdema of the vitreous, arising from the tissue colloids possessing an abnormal affinity for water, due to an increase in their acid contents, there being either an excessive production, or a defective elimination, of acid. It is quite true that a distention of the vitreous is apparently not infrequently the first incident in an attack of glaucoma; but, as has been pointed out above, there appears to be reason to think that the vitreous body is not itself hydrophyllic. In any case, it is quite clear that the profession has not hitherto shown any general inclination to adopt the hydrophyllic theory; the evidence in its favour has seemed too scanty and too weak. This is, however, quite a different thing from the assumption that there is no germ of truth lying hidden in the views we have been discussing. The causes of glaucoma are doubtless very diverse in different cases, and it would be as rash as it would be uncalled-for to deny all value to views which do not appeal strongly to us either as individuals or as a profession.

REFERENCES.

1. **Fischer, Martin H.**—Pflüger's *Archiv für Physiologie*, Vol. CXXVII, 1909, abstracted in *Ophthalmic Review*, Vol. XXIX, 1910, p. 72.
2. **Ruben, L.**—*Thirty eighth Ophthalmological Congress*, Heidelberg, p. 133.
3. **Maynard, F. P.**—*Indian Medical Gazette*, 1909.
4. **Ischreyt, G.**—*Archives of Ophthalmology*, July. 1908, p. 441.
5. **Thomas, H. G.**—*Journal of Ophthalmology and Oto-Laryngology*, Vol. V, p. 205.
6. **Sedwick, W. A.**—*Ophthalmic Record*, Vol. XXI, p. 187.
7. **Grandclément, E.**—*La Clinique Ophtalmologique*, Vol. XVIII, p. 275.
8. **Scalinci, N.**—*Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(To be continued.)

CONGENITAL WORD- AND LETTER-BLINDNESS.

BY

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CASES of congenital word- and letter-blindness, or *alexia congenita*, are probably more common than would appear from the number of cases recorded in the literature. Doubtless a search among our elementary schools would reveal many more. An inability to read is of not infrequent occurrence among the feeble-minded; but true word-blindness, with little or no other mental defect, comes under a different category. Only 64 cases of this condition have been reported, and it is noteworthy that the defect appears to be more prevalent among boys than girls, for of the 64 cases, 47 were males and only 17 females. It is at times found in more than one member of a family, and as many as six cases in one family have been observed.

The following case has recently come under my observation, and presents several points of interest.*

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* The patient was shown before the Section for the Study of Disease in Children of the Royal Society of Medicine on November 26th, 1915.

The patient is a physically well-developed girl, aged eight years. In appearance she is bright and not unintelligent, but her manner is shy and reserved, and she is inclined to associate with adults rather than with other children. In disposition she is placid and good tempered, and she shows no signs of any neurotic tendency or nervous instability. She was born at full term, after a normal labour, and was breast-fed until aged ten months. Three years ago she had measles, followed by pneumonia and whooping-cough. About the same time her tonsils and adenoids were removed, and she suffered from otorrhœa for three months. She has never had any fits. There are two other children in the family ; one aged nine years, who is perfectly normal and can read well, and one aged four years. No miscarriages. One child died during its second year from tuberculous meningitis, and the grandfather and one aunt on the maternal side were also tuberculous. The paternal grandfather is said to have some difficulty in spelling, but otherwise is of average intelligence.

The girl went to school two years ago, and she is now only in the class above the infants, her defective powers having always been commented upon by her teachers. Her general intelligence, at first sight, appears good. She answers questions readily and with a smile, and will promptly carry out a series of actions when bidden, *e.g.*, go to the table, take two matches out of the box, place them on the table, and bring back the box. Her memory is quite good for both past and recent events, and she recognizes people easily, even after a long interval. She also knows the way about her neighbourhood, and can sew fairly well for a child of her age. A closer examination, however, reveals some curious deficiencies.—For instance, she cannot tell her age, but knows that her birthday is on Boxing Day, although she is unaware when exactly Boxing Day comes. She knows the day of the week, but not the month or the year ; she can repeat the days of the week, but not the months. She has no knowledge of coins or of the value of money beyond the bare fact that twelve pence make a shilling. Thus, in some ways, she is below the normal standard for her age.

As regards the essential features of the case, she cannot say the alphabet, but can write it perfectly on rare occasions, although generally she stops about E or F and then goes wrong. She cannot write a given letter, except occasionally A, and can only at times pick out one or two letters from copies. or from what she has herself written. Her acquaintance with figures is limited. She can count up to twenty, but has no knowledge of numbers above that. She can write the numerals up to twelve, but frequently misses one out and usually stops at nine. Occasionally, she can write a given numeral and point one out, and is most likely to succeed with the first four. She can count a number of objects up to fifteen, and can pick out a given number, but she cannot do the simplest addition in her head. She has no knowledge of Roman numerals. She cannot spell words of even two letters, and cannot read easy words like *is*, either from print or writing. On the other hand, she recognizes a few words like her name, *rat*, *cat*, and *dog* when spelt to her. She cannot write from dictation simple words with certainty, *e.g.*, *at* is at times written correctly and at others *ta* ; *on* is a failure ; *cat* is mostly written correctly, but when following immediately after *dog*, the word *dog* is sometimes repeated, and *dog* itself at times becomes *gdo*.

Her writing appears to consist merely of a limited number of ideograms, which may or may not be correctly performed. Thus, she can write her own name and the name of her school correctly ; but when told to write either *R . . e* or *E . . . y* separately, she still writes her full name, *R . . e E . . . y*. In the same way, when asked to write *school*, she writes *Picardy school*, and the same thing occurs when she is told to write *Picardy* alone. Her powers of concentration flag after a time, and on one occasion, when getting tired and told to write *Picardy*, she wrote *R . . e school*. As a rule, she writes and replies fairly quickly, but at times she has a long latent period, and if this is extended beyond three or four seconds, she is generally wrong in her answers.

A further interesting feature in the case is that she will voluntarily write a complicated word like *transcription*, evidently from the top of a copybook, but transposes the last two letters and produces *transcriptino*. On the other hand, she cannot write *description* or either of the syllables *trans* or *scription* separately. Another voluntary effort is to write *copy writing*, which appears as *copy writino*, the *tin* in the final syllable being evidently the same mental picture as the mistake in *transcription*. These two errors she uniformly perpetrates. When, after an interval, she is asked to read words which she herself has written, she is quite unable to do so.

As usually happens in cases of word- and letter-blindness, she can copy correctly anything that is written for her, even unknown letters like Greek. This, however, is a purely mechanical process, as she reproduces the form and even the spacing of the letters without their conveying anything to her mind. Printed words are generally transcribed in printing characters, but occasionally she will copy them in her ordinary handwriting, although again quite unaware of their meaning. She will copy accurately simple free-hand drawings, and can draw a cross and a square when asked to do so. Attempts to copy black and white illustrations, and even outline drawings, are very feeble, but crude efforts are made at drawing out of her head objects, such as an engine, and she can name the component parts, such as the wheels and funnel.

Her interpretation of illustrations is fairly good, but she did not know an elephant, a donkey, or a goat. On the other hand, when shown a picture of a Chinese woman, she was nearly right in describing it as a Japanese girl. She knows the elementary colours, and has some knowledge of form, in that she recognizes a cross and a square, but she does not know a triangle.

The child has no word-deafness. She understands what is said to her, and her vocabulary, so far as can be judged, for she speaks but little, is fairly extensive for a child of her age and disabilities, and she can repeat "pieces" which she has learnt by heart. There is thus no verbal amnesia nor motor aphasia. She can name ordinary objects and specify their uses, and is so far observant, that, when shown a broken toy watch and asked if there was anything peculiar about it, she said what it was, and remarked that it had lost its hands. She knows the use of a watch, but cannot read the time or say approximately what time of day it is.

Her sight is good, and there is no hemianopia. There is no nystagmus nor intention tremor, and all the reflexes are normal. The Wassermann reaction is positive.

The pathology of these cases is somewhat obscure. Rutherfurd* considers it to be of the nature of a reversion to the pre-civilised type, an example of atavism ; but in view of the positive Wassermann reaction in the present instance, it is possible that the lesion may be of a syphilitic origin. As this patient is word- and letter-blind, and also letter-deaf, as shown by her lack of knowledge of the alphabet and her inability to spell, the defect, of whatever nature it may be, must be situated around the posterior extremity of the left fissure of Sylvius, as it is in this region that the centres lie. The visual word- and letter-centre is in the left supra-marginal and angular convolutions, whence it is connected by commissural fibres with the primary visual centres in both occipital lobes, and the auditory letter-centre in the posterior part of the first left temporo-sphenoidal convolution. But now comes a difficulty which it is hard to explain. How is it that if the centre in the supra-marginal and angular convolutions on the left side is impaired, the corresponding area on the right side does not take on its function in the same way as the third right frontal convolution is supposed to act with regard to speech in left-handed persons, or when the third left frontal (Broca's convolution) has been put out of action? In children, with their aptitude for learning, it might be expected that this would naturally occur. Is it, then, to be supposed that in a case like the present there is a symmetrical defect on both sides of the brain? This would appear an extreme hypothesis. And if the defect is situated so as to affect the commissural fibres from both occipital lobes to the supra-marginal and angular convolutions in both hemispheres, it would almost certainly involve the optic radiations passing to the visual centres in the occipital lobes, and thus cause hemianopia, or some other form of blindness. In this case there is no impairment of vision. It must be supposed, therefore, that the defect is a cortical one in the situation indicated without its being possible at the present time to explain why the corresponding areas on the right side do not take on the functions of the impaired centres. The visual word- and letter-centre is not entirely functionless, as the patient is able to recognize one or two letters at times, and has some power of writing, which shows that the visual word-centre is capable of stimulating the graphic motor-centre; otherwise agraphia would result.

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* *British Journal of Children's Diseases*, 1909, Vol. VI, p. 484.

The outlook in these cases is not altogether hopeless. According to Sydney Stephenson,* even severe cases are capable of considerable improvement with systematic and sympathetic training.

A FALLACY IN THE DIAGNOSIS OF GLIOMA RETINÆ.†

BY

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FROM a clinical standpoint the expression "Pseudo-Glioma" possesses a certain convenience, but pathologically, as we all know, it is about as loose and inexact as any term can well be.

The conditions that are most commonly mistaken for glioma include metastatic irido-cyclitis and extension retinitis. Gross tubercle of the choroid, too, as pointed out by the late W. A. Brailey (*Trans. Ophthal. Society U.K.*, Vol. III, 1883, p. 129), may also lead to confusion, although such cases are admittedly very rare. Lastly, certain congenital anomalies, to which special attention has been directed by E. Treacher Collins ("Researches into the Anatomy and Pathology of the Eye," 1896), may be difficult or impossible to diagnose from glioma.

To the foregoing conditions I now venture to add another possible source of confusion, namely, retinitis exudativa or retinitis hæmorrhagica externa, as differentiated by George Coats several years ago in a well-known communication published in the *Royal London Ophthalmic Hospital Reports* of November, 1908.‡

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* [illegible] Vol. IV, [illegible]

† [illegible] Medicine.

‡ [illegible]

I do not for a moment flatter myself that the connection in question has escaped the attention of some other observers, although, so far as I am aware, nobody has brought it prominently forward, as I venture to do on this occasion. For that matter, in a widely-quoted communication on "Pseudoglioma" written by E. Treacher Collins twenty-three years ago (*Royal London Ophthalmic Hospital Reports*, December, 1892, p. 361) a series of eleven cases was described where the appearances that clinically simulated glioma were found, on pathological examination, to be due to inflammatory exudation into the vitreous, with or without detachment of the retina. An attentive perusal of the details shows that of the eleven cases, several were instances of retinitis exudativa. The communication, it should be added, was written sixteen years before George Coats clearly differentiated the condition from a crowd of others (1908). An instructive case of the kind was published recently by a Japanese surgeon, Hajano, where the eye of a small boy, aged two years, was enucleated as an instance of true glioma. On pathological examination, there was found complete detachment of the thickened and folded retina, the deeper layers of which showed changes believed to be those of retinitis exudativa (v. Graefe's *Archiv f. Ophthal.*, LXXXIV, i, p. 30, 1913).

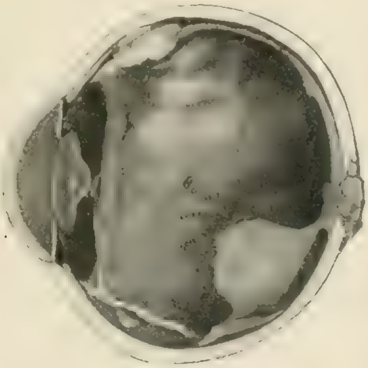

FIG. 1.

The first case that drew my attention to the subject was in a little boy, aged 2½ years, who was brought to me in May, 1908, because he "had a kind of cast in his left eye." Since an attack of influenza three months before I saw the child, the eye had been inflamed from time to time, and the father (an observant person) had occasionally noticed a shining appearance "like that from a cat's eye."

On examination, the patient's left eye was found to be blind, and its tension was thought to be raised. There was slight ciliary redness. The pupil was quadrilateral in outline, and motionless to light. With the mirror, areas of clear fundus could be made out here and there, interspersed with greyish-white masses of flocculent material. Several groups of strikingly bright spots and patches (difficult to locate exactly) could be seen in various parts of the fundus. A hæmorrhage was present in the lower-outer part of the vitreous.

The right eye, it should be added, was normal in all respects.

It was thought that the condition might possibly be one of glioma endophytum, and the eye was removed under that supposition.

The eyeball, which measured 20 mm. by 20 mm., was frozen, and divided into a nasal and a temporal half by a vertical antero-posterior section.

To the naked eye (Fig. 1), the anterior part of the globe showed no obvious change, except for a rather striking blunt projection in the neighbourhood of the posterior pole of the crystalline lens, the so-called "moulding." The retina was nowhere grossly detached. The cross section of a greyish-white nodule (5 mm. by 2 mm.) lay between choroid and retina far forward near the ora serrata, and was evidently part of a larger mass in the same region. Signs of other nodules were to be dimly seen scattered, as it were, haphazard over the remaining parts of the hemi-section. Several groups of shining points, probably cholesterin, were present here and there.

On pathological examination, nodules of newly-formed fibrous tissue were found in the outer layers of the retina, particularly in the vicinity of the upper part of the ora serrata, where larger masses had evidently been formed by the aggregation of smaller ones. The nodules were permeated by a system of clefts, which doubtless had once held cholesterin crystals, dissolved out by the ether and other chemicals used in making the preparations. They included for the most part a good deal of pigment, and contained larger or smaller collections of giant cells and of disintegrating blood clot (Fig. 2). The retina was degenerate and more or less disorganized, although the outer nuclear layer could be recognised in places. The lumen of many of the retinal vessels was narrowed or displaced by hyaline changes (Fig. 2).

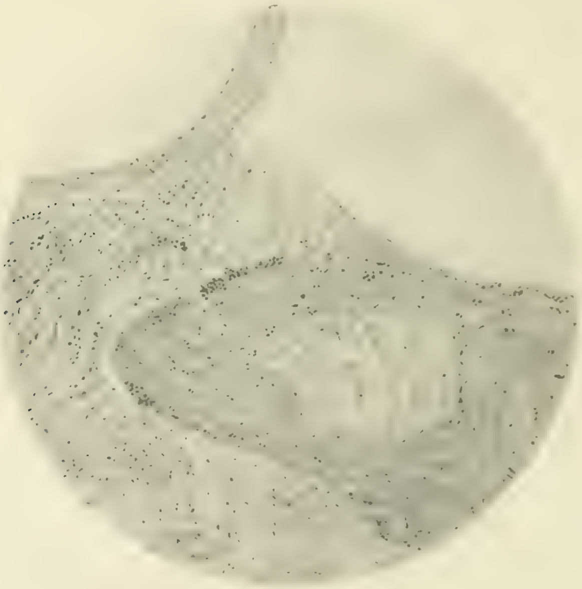

FIG. 2.

In brief, then, a typical nodule lay in the depths of the retina, and was composed in the main of newly-formed fibrous tissue, coloured red by van Gieson's stain, and permeated by an extensive system of cholesterin clefts. It contained numerous pigment particles, and enclosed one or more cavities of irregular shape, which often inter-communicated and were frequently more or less filled with the remains of disintegrating blood in the shape of *débris*, degenerate blood corpuscles, particles of pigment, networks of fibrin, swollen leucocytes, and giant cells (Fig. 3). Neither calcareous nor osseous changes were found. In many of the sections the choroid could be traced unaltered over the nodules, but in some, the two structures appeared to be in organic connection.

For the rest, the angle of the anterior chamber was closed. The tissue of the iris was atrophic, with pigment clumps here and there, and had evidently been inflamed. The subcapsular epithelium extended around the lens.

For the other case I am indebted to Mr. Arthur B. Zorab, of Southampton, to whom the patient, a little girl, aged four years, was brought in February, 1914, because the left eye appeared to be blind and had been noticed to turn inwards. Mr. Zorab found that the tension of the affected eye was *plus* 1, and that a bluish-grey reflex could be obtained from the fundus with the ophthalmoscope. After dilatation of the pupil, a complete detachment of the retina was observed. The retina could be traced up to its most anterior limits all round, except for a small area to the other side, where a "dip" could be made out. By focal illumination, the retinal vessels could be seen.

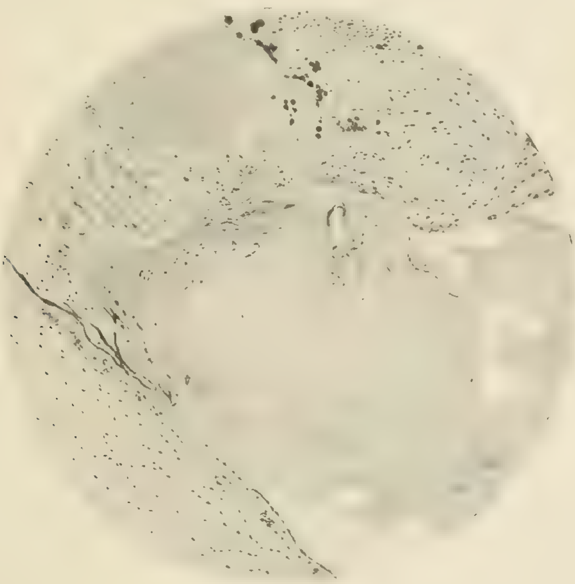

Fig. 3.

Mr. Zorab thought it probable that the eye contained a glioma, and it was accordingly excised. The specimen was placed in 1 per cent. formalin, and forwarded to me for examination.

The child was seen by Mr. Zorab in September last—that is, upwards of eighteen months after the operation—when the general health was found to be good, and the remaining eye showed no signs of mischief.

The pathological condition of the excised eye was briefly as follows:

The retina was detached *in toto*. The subretinal space was filled with an abundant homogeneous coagulum, containing "ghost cells" and cholesterin clefts. Although degenerate, the nuclear layers of the retina could usually be recognised as such. In places the retina was infiltrated with "ghost cells" similar to those present in the subretinal coagulum. In the outer layers of the retina, more particularly in the neighbourhood of the ora serrata, were nodules of two kinds, both of which had evidently been formed from extravasations of blood. The first took the form of more or less homogeneous collections of fibrin or of newly-formed connective tissue (Fig. 4).

The second occurred as collections of pigmented tissue cells, intermingled with new fibrous tissue and remains of blood corpuscles. These included tolerably numerous cholesterin cracks or clefts. For the most part, the choroid was

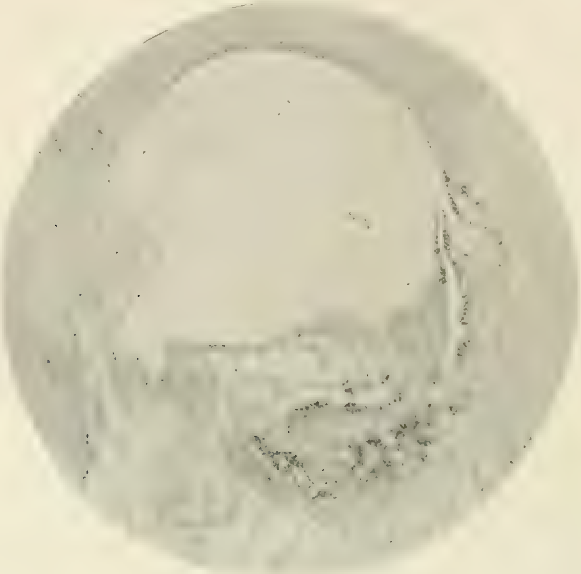

FIG. 4.

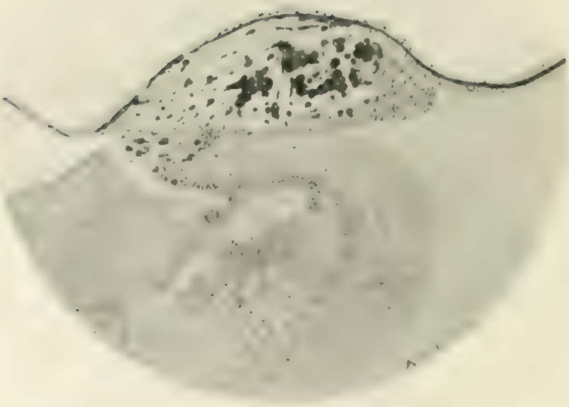

FIG. 5.

quite distinct from the retinal nodules, but in one small mass of reniform shape, the two appeared to be in structural continuity through imperfections in the pigment epithelium (Fig 5). Many of the retinal vessels were thrombosed, and hyaline changes, leading to narrowing or displacement of the lumen, were not uncommon. The choroid showed no particular lesions. As regards the anterior half of the eyeball, the ciliary body and the iris were atrophic, and the uveal pigment could be seen to extend around the edge of the iris (ectropion uveæ). The posterior pole of the lens was somewhat "moulded." The angle of the anterior chamber was closed.

In conclusion, I take this opportunity of tendering my thanks to Mr. George Coats, who confirmed the pathological diagnosis of the foregoing cases

A CLINICAL STUDY OF FIFTY-FIVE CASES OF INTRA-OCULAR RETENTION OF FOREIGN BODIES, WITH RESULTS TWO YEARS AFTERWARDS.

(Continued.)

BY

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Prognosis.

In all cases of penetrating injury to the eyeball, with retention of a foreign body, it is important to give a guarded prognosis.

This will be seen from the results of my own cases, and from all statistics. A penetrating wound, without retention of a foreign body, inclines one to more hopeful prognosis, as will be noticed from the thirty cases which I treated (see second list). These were not picked but were odd cases of this kind which were admitted to the Glasgow Eye Infirmary from 18th November, 1911, to March 11th, 1912. I took a note and followed them up, just to show the results as compared with those in which a foreign body was lodged in the eye.

To the patient, or to anyone not experienced in these matters, the removal of the foreign body by the magnet is apt to be thought of as indicative that the worst of the trouble is over. Personally, after removal of the foreign body, even of a small spicule lodged in the anterior chamber, I always tell the patient that the metal has been removed, but that it is very necessary to watch the eye carefully for a week or two, at the very least, before one is able to give anything like a definite prognosis. I think it well, indeed, sometimes to show the patient the foreign body that has been removed, as in three separate cases the patients would not believe that the metal had been removed when it came to a question of advising enucleation of the eye, the patients having a false idea that the metal was still in the eye, and was responsible for keeping up the inflammation. This small matter is merely mentioned, and I allude to it only as having come under my notice in dealing with workmen somewhat ignorant in affairs of this kind.

Although, then, the prognosis must be extremely guarded, one is aided a good deal by consideration of the following points :—

(*a*) This includes the first examination of the eye, the history, the X-ray plate, and the removal of the metal by the magnet.

1. *The condition of the eye when the patient first presents himself.*—An eye which is hopelessly damaged when first seen, should of course be removed at once, and in a case of this kind the chance of sympathetic disease is rather remote.

2. *The time intervening between the date of the injury and the attendance of the patient.*—Prompt treatment is important in these cases. An eye with signs of iridocyclitis or hypopyon, already developed by the time one sees the case, naturally does not give grounds for a good prognosis. In these cases the presence of the foreign body has set up inflammation in the eye, and also the foreign body has become more firmly fixed in the tissues of the eyeball; it is more difficult to remove, and its removal causes more injury to the structures of the eye than would be the case if the injury were more recent. I am well aware that a foreign body can be retained in the lens and anterior chamber for years. Many such cases have been recorded. Still, I think that the general experience is that the longer a foreign body remains in the eye the less hopeful is the prognosis, especially where inflammation has been set up by its presence.

3. *Size and character of the foreign body.*—Some authorities state that there is less likelihood of inflammation where the piece of metal is hot, as it is then practically aseptic. Taking these cases as a whole, I find myself unable to agree with this view. Again, copper, more than iron or steel, is said to be notorious for setting up inflammation in the eyeball. Curiously enough, my only copper case (2), where the foreign body was lodged in the sclera at the back of the eye, did exceedingly well, and retained useful vision when seen two years later, although repeated attempts at removal, including a sclerotomy, were unsuccessful.

Of more importance is the size and character of the metal. As one would naturally expect, the larger the fragment the more damage does it inflict, but I would qualify this statement by saying that I would give a more hopeful prognosis where a large scale of metal was lodged in the anterior chamber or iris than where a small spicule had punctured the cornea or sclera and had lodged in the posterior part of the eye. I shall refer to this again under heading (4).

Like J. Wharton,[25] I think these pieces of metal are best classified as "chunks," "scales," and "spicules." Spicules are, as a rule, easiest to remove, although they are rather apt to become entangled in the iris when drawing them into the anterior chamber by the magnet.

As Rollet[26] has shown by a series of experiments, the shape of the metal influences its extraction by the magnet more than the proportion in weight. He found that elongated bodies, such as needles, are more easily extracted than small blocks, and this confirms the clinical experience that small spicules and scales are most easily extracted by the magnet.

Scales are apt to inflict considerable damage on the eyeball, since the edge cuts like a knife, and sometimes inflicts incised or punctured wounds of the lids before entering the eye. Now and then they come out very easily, especially when they engage "edge on" to the magnet point. It is when they engage "broadside on" that difficulty is experienced, and if the manœuvre of which I have previously spoken is not successful, the wound, if attempts at drawing the scale into the anterior chamber do not succeed, may require to be enlarged. Chunks are frequently of large size and inflict considerable damage.

4. *Position of the wound and of the metal in the eyeball.*—These are important in the future prognosis, particularly the position of the metal.

(1) *Anterior chamber, iris, or lens.*—Undoubtedly, the cases where there is a wound in the cornea and the metal has come to rest in the anterior

chamber, iris, or lens, are the most hopeful cases, as regards both the saving of the eye and the retention of useful vision.

In many of these cases the lens was injured, but even then, where the lens matter had been drawn off, a fully-sized eye was left in the patient's orbit as a rule, and, again, it might retain useful vision. This will be noticed on looking up the results of this class of case in the first list. I am quite convinced that the percentage of eyes noted as "saved," on looking into statistics in these metal injuries, depends on the number where the metal was lodged in the anterior part of the eyeball. The greater the number where the metal is lodged in this region, the higher will be the percentage of eyes "saved."

The foreign body which lodges in the vitreous usually sets up an iridocyclitis, either by its actual presence, or by its carrying in micro-organisms as it pierces the conjunctival sac, which virtually always contains germs of some sort. I have found in these cases of iridocyclitis that, on taking a conjunctival culture, while occasionally more virulent organisms like streptococcus and staphylococcus may be present, in a great number of cases the culture tube yielded only *B. Xerosis.* In view of all these findings, one can only suppose that the *B. Xerosis* has become more virulent when brought into contact with a good culture medium such as the vitreous humour.

Charles Goulden[27] published results of 118 cases where the foreign body had been removed by the magnet. He pointed out that, if the foreign body was anterior to the vitreous and the lens was uninjured, all the eyes were "saved," and in none was the resultant vision less than 6/12. He was of opinion that cases where the foreign body was lodged in the vitreous, having passed through the cornea, were more favourable as regards prognosis than where the foreign body was lodged in the lens.

After a consideration of my own results, and those of others, I cannot agree with the latter statement. Of my 55 cases, 10 were of this sort, that is, where the foreign body was lodged in the anterior chamber, iris, or lens, and, in every one of them the eye was "saved" and useful vision retained. Six had a V.A. of 6/6 to 6/12; when lens was subsequently extracted, three had a V.A. of 6/24 to 6/36, and one had a V.A of 4/60.

(2) *The ciliary region.*—Of ten cases, eight eyes were "lost" and two were "saved." Of the two saved, one had a vision of 6/18, and the other was reduced to counting fingers.

A wound in the ciliary region has long been recognised as serious. The direction of the wound, as causing more or less injury to the eye, is to be noted; a meridional wound, other things being equal, causing less injury than oblique or equatorial wounds, as can readily be understood from the anatomy of the parts.

Let us compare for a moment ciliary wounds with retention of a foreign body in the vitreous, with similar wounds where a foreign body was not present (see second list). Of sixteen cases of this latter sort, only four eyes were enucleated, and ten were "saved" Of those saved: eight had visual acuity ranging from 6/9 to 6/18, one had visual acuity of 1/60, and one had visual acuity of perception of light, even where the lens had subsequently been extracted in some of these cases. Therefore, I would state that, given a ciliary wound with prolapsed iris, etc., with no foreign body present, provided that asepsis is carefully observed, even although the lens is injured, and the wound carefully covered by conjunctiva after excision of all prolapsed iris, etc., these wounds are not so much more serious than corneal wounds, as is stated in the text-books. It is the presence of a foreign body in the vitreous which sets up the mischief, as a rule, and makes the injury so much more grave.

(3) *Where the wound is corneal, and the foreign body usually small, has*

passea into the vitreous or into the orbit beyond, frequently including the lens in its path of entrance, and setting up traumatic cataract.—Of eighteen cases of this sort, eleven were "saved,' three had a V.A. of 6/9 to 6/36, three had a V.A. of 2/60 to 6/60, after the lens was extracted, and five had a V.A. of perception of light—counting fingers. Seven eyes were lost from plastic iridocyclitis

I consider these cases quite as serious as those where the wound is in the ciliary region, for the following reasons:

First, the corneal wound being often very small, and especially if the lens has not been injured, attention may not be paid to the eye by the patient, or by the inexperienced observer, until a few days after the injury, when signs of iridocyclitis may have developed. Secondly, as was mentioned previously, the foreign body may have penetrated the posterior part of the eye and lodged in the orbit beyond, and in these cases the magnet is of no avail, so far as its removal is concerned.

Both of my cases of sympathetic ophthalmitis developed in cases where the metal had lodged behind the eyeball. In one, the external wound was corneal, and in the other it was scleral. In the former the eye was enucleated a month after the date of the injury; and in the latter twenty-nine days after the injury, owing to the non-consent of the patient to operation.

In these cases the foreign body, owing to its passage through the structures of the eyeball, usually sets up a virulent iridocyclitis.

Although, as I have mentioned before, in one case (2) a piece of copper was lodged in the back of the eye, and was noticed with the ophthalmoscope projecting into the vitreous, the eye remained perfectly quiet and good vision was retained.

(4) *Scleral Wounds.*—Of seventeen cases of this sort, six eyes were "saved"; three had a V.A. of 6/9 to 6/24, and three had a V.A. of perception of light to hand movements; eleven eyes were "lost." I would put these cases in the same category as (2) and (3). There is usually some loss of vitreous, especially where a large scale has inflicted the injury, and if the eye is saved, the vision is, as a rule, poor, and detachment of the retina is liable to follow.

To recapitulate: cases where the metal is lodged in the anterior part of the eyeball (anterior chamber, iris, lens, or circumlental space) give the most hopeful prognosis, whether the wound is in the ciliary region or not. Cases where the metal has lodged in, or passed through, the vitreous, whether the wound be ciliary, scleral, or corneal, are to be approached with caution from the first.

(5) *The difficulty or ease with which the metal is removed by the electro-magnet, and the amount of damage inflicted on the eyeball at the time of operation.*—This speaks for itself. Any necessary enlargement of the wound or laceration of the ciliary region causing troublesome hæmorrhage and later iridocyclitis, loss of vitreous, injury to the lens, or failure to remove the foreign body must, of course, influence the prognosis.

All the preceding points help one in giving some idea of the prognosis at the commencement of the case, but I again emphasise the fact that, unless the metal is anterior to the lens, or in the lens, the prognosis must be extremely guarded, both as regards the possible loss of the eye, and if the eye is retained, as regards the resultant visual acuity and the risk of sympathetic ophthalmitis.

(*b*) After an interval of two or three weeks, as a rule, except in a case where there is necessity for urgent removal of the eyeball, there comes the question of prognosis as regards any probability of sympathetic ophthalmitis developing.

As far as we know from trustworthy records, the shortest interval between the injury of the "first" eye and the onset of sympathetic ophthalmitis in the "second" eye is fourteen days, and but few cases with this brief incubation period have been recorded.

The most dangerous period, from all accounts, seems to be somewhere between the sixth and twelfth week after the date of the injury. With regard to my own two cases of sympathetic ophthalmitis, in one (No. 33) the eye was enucleated one month after the injury, and the first sign of sympathetic ophthalmitis was observed two months after the injury. In the second patient (No. 39) the eye was also enucleated about a month after the injury, and the first signs of sympathetic ophthalmitis developed seven months after the original injury.

According to Swanzy,[28] in 170 of 200 cases collected by the Committee on Sympathetic Ophthalmitis of the Ophthalmological Society, the second eye was attacked within the first year after injury to the first eye. In only 12 of the 200 cases was the interval more than one year, and the longest was 20 years. I have lately come across a case of sympathetic ophthalmitis at the Blackburn and East Lancashire Infirmary, which had apparently developed thirty years after the injury to the first eye.

In the second of my cases mentioned above, the appearance of sympathetic ophthalmitis in the second eye seven months after the injury to the first eye, shows the extremely complex nature of sympathetic ophthalmitis, and in a case of this sort, where the second eye becomes attacked after such a long interval, before diagnosing sympathetic ophthalmitis, I think it is well to weigh the following points laid down by Swanzy[14]:—

1. The condition of the exciting eye, and the nature of the injury to that eye; 2. The condition of the sympathising eye; 3. The interval that has elapsed between the injury to the first eye and the onset of sympathetic ophthalmitis in the second eye; and 4. The state of the general system.

We may glance at these several points:

1. *The condition of the exciting eye, and the nature of the injury to that eye.*— —Adhering strictly to the class of case, *i.e.*, injury with retention of foreign body, these are just the cases to give rise to sympathetic ophthalmitis. I need scarcely allude again to the usual clinical picture of an eye which has had a piece of metal removed from it, and has had irido-cyclitis in it, now less acute, now flaring up at short intervals, the pupil not dilating so well under atropine, the iris tissue being less well-defined and somewhat rusty-looking, perhaps some punctate deposits on the back of the cornea, posterior synechiæ, and a hazy-greenish vitreous, the tension falling and the vision practically *nil*, and frequently tenderness on pressure over the eyeball; later the soft eyeball becoming quadrangular in shape, owing to the pull of the four recti muscles. This is the eye which is liable to give rise to sympathetic ophthalmitis, and enucleation should be advised. The eye is of no use to the patient, and, if left, will degenerate into a condition of phthisis bulbi.

An eye which goes on to panophthalmitis is rarely followed by sympathetic ophthalmitis, although, as mentioned previously, I have lately seen an exception to this rule. Presumably, in panophthalmitis, the suppuration, caused by the staphylococcus or other organisms, destroys the sympathetic organisms (supposing that sympathetic disease is due to an organism).

2. *The condition of the sympathising eye.*—The disease usually starts as an irido-cyclitis of the plastic type. These cases are the worst from the prognostic point of view. My second case of sympathetic was of this type, and ended with practically no vision in the eye. Sometimes, there is what is termed a serous irido-cyclitis when the infection is mild, and often an optic neuritis

can be made out. My second case conformed to this type, and the resultant vision was 6/6 and J.1.

3. *The time interval* has already been discussed.

4. *The state of the general system.*— Another cause of irido-cyclitis might be forthcoming if the patient were syphilitic, tuberculous, etc.

From these observations one can see that the patient cannot be regarded as being out of the wood as regards the probability of sympathetic developing, until at least a year has passed, and should be told that on the slightest pain or failure of vision in the second eye, he should report himself. As a rule, he is not slow to do this on his own account. Frequently we find the eye looking quite well, but, if there is an element of doubt, a blood count should be taken, to make out if there is an increase in the large mononuclears, and a reference should be made to the condition of the first eye, if that has been enucleated, to see whether a "sympathetic infiltration" was present or not.

(*To be continued.*)

CLINICAL MEMORANDA.

OLD PEOPLE WITHOUT THE USUAL PRESBYOPIA.

BY

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Case 1.—Judge P. Age 77 years. His wife advises him to get glasses because of transient attacks of poor vision especially in the left eye when going into the sun. R.V. 6/12 with −·5 D. sph.=6/6, 4 letters. L.V. 6/12 with −·75 D. cyl. axis 90 degrees=6/6, 2 letters. No stronger glass improves vision. Reads Snellen 1 without glasses at ordinary distance, but was ordered R.E. plus 1·0 D. sph. and L.E. plus 1·5 D. sph. with minus ·75 D. cyl. axis 90 degrees for reading.

Exophoria of 5 degrees.

Case 2.—Miss S. L. W. Age 71 years. R.V. 6/9 plus ·75 cyl. axis 180 degrees=6/6. L.V. 6/9. plus 1·0 sph. with plus 1·25 cyl. axis 180 degrees=6/6. Without any glasses, she reads easily and fluently Snellen No. 2 type at ten inches, and also appears to use with comfort, at least during the test, the usual addition for presbyopia for her age

The external rectus muscle never has shown any power, if it exists, and occasionally the left eye deviates inward. The right tear canal is stopped by chronic dacryocystitis.

A SECOND CASE OF "GLASS-WORKERS'" CATARACT IN A PUDDLER (Iron-smelter).*

BY

BERNARD CRIDLAND, F.R.C.S.Ed., D.O.Oxon.

WOLVERHAMPTON, ENGLAND.

THE following is the second case of typical "glass-workers' cataract" ("ray cataract") in a puddler, which has come under my observation at the Wolverhampton Eye Infirmary in the past nine months.

T.W., *æt.* 66, has worked as a puddler for 48 years and has never been in a glass-furnace. During his work he has not worn protective goggles

When first seen on October 19th, 1915, he complained that his vision had been failing for the past three or four years, but that there had been no alteration since January last, when, on account of his faulty vision, he had been forced to give up his work.

On examination, both conjunctivæ present the chronically inflamed appearance usually met with amongst iron-workers. The corneæ are clear; irides normal and reacting fairly well. The vision of each eye is 2/60th, not improved by glasses. Through the undilated pupils, the lenses present the appearance of nearly mature senile cataracts.

On dilatation, the condition is as follows:—

Right lens.—(A) By oblique illumination.

A central nuclear haze with, situated at the posterior pole and lying in the most posterior layers of the cortex, a small dense opacity, oval in shape, with long axis horizontal. Its centre is clearer than its edge, which is well-defined, but is occupied by a smaller ring concentric with it and apparently lying in a plane posterior. The peripheral part of the lens is comparatively clear, although showing radial striate opacities.

(B) With the ophthalmoscope.

The contrast now seen as compared with that by the foregoing method is striking, for the small central opacities cannot be detected, but instead there is seen a somewhat dense opacity roughly quadrilateral in shape and occupying a much greater area.

Left lens.—Much the same appearance is presented, namely, small central ring opacities by oblique light and a larger less dense opacity, quadrilateral in shape with the ophthalmoscope. On the whole, this lens is more opaque than the right and the radial striæ at the periphery are more marked.

Both fundi can be easily examined through the peripheral portions of the lenses and show no lesions.

The first case, which was published by the writer in the last March number of THE OPHTHALMOSCOPE, has since been successfully operated on. No needling was found necessary, notwithstanding the comparatively large amount of clear lens substance present in each.

A perfectly clear view of each fundus is obtainable.

R.V. on correction equals 6/12. Fundus normal, and there is no apparent reason why the vision should not be better.

The question, therefore, arises whether a lesion of the retina at the macular region or in the nerve may not be present in addition as the result of the prolonged exposure to heat and light rays.

The vision obtained in the left eye has not yet been determined, as the patient is irregular in his attendance at the clinic.

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*The first of these cases was published by Mr. B. Cridland in THE OPHTHALMOSCOPE of March, 1915, p. 126.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(1) Coppez, H.—The ocular complications of Paget's disease. (Complications oculaires de la maladie de Paget.) *Journal Médical de Bruxelles*, 13 juin, 1912.

(2) Bradburne, A. Alison.—Ocular imbalance and auditory affections. *British Medical Journal*, 19th October, 1912.

(3) Wilson, James Alexander.—A case of keloid of the eyelids associated in its onset with measles. *Lancet*, 30th November, 1912.

(4) Benedict, William L.—A study of the eye-ground in psychoses. *Annals of Ophthalmology*, April, 1913.

(5) Haas.—Propagation of a nasal diphtheria by the lacrymal passages. (Propagation lacrymale d'une diphtérie nasales.) *La Clinique Ophtalmologique*, 10 août, 1913.

(6) Brunetière.—Can ocular filaria (filaria loa) cause cerebral complications? [La filaire de l'œil (filaria loa) peut-elle déterminer des complications cérébrales?] *Ann. d'Oculistique*, août, 1913.

(7) Adams, Charles Franklin.—Adenoids as a factor in amblyopia. *Ophthalmology*, January, 1914.

(8) Claiborne, J. Herbert.—A case of sudden bilteral blindness following a fit of anger, with resultant permanent bilateral central (paracentral) scotoma. *Annals of Ophthalmology*, April, 1914.

(9) Patton, James M.—Ocular symptoms associated with oxycephalus or tour skull. *Annals of Ophthalmology*, April, 1914.

(10) Lewis, F. Park.—Psychic disturbances involving the eye. *Annals of Ophthalmology*, April, 1914.

(11) Welton, Carroll B.—Glaucoma as a contributing ætiological factor in insanity, with report of a case. *Ophthalmic Record*, May, 1914.

(12) Lint, van—Familial optic atrophy due to thyroid insufficiency. *Société Belge d'Ophtalmologie*, 26 mai, 1914.

(13) Péchin.—The ocular complications of blenorrhagia. (Complications oculaires de la blennorragie.) *Revue Générale d'Ophtalmologie*, 30 juin, 1914.

(14) Alexander, E. W.—An unusual case of ophthalmic migraine. *Ophthalmology*, July, 1914.

(15) Hawley, C. W.—Auto-intoxication and eye diseases. *Ophthalmology*, July, 1914.

(16) **Beaumont, W. M.**—The evolution of iritis. *British Medical Journal*, September, 1914.

(17) **Trantas, A.**—Ocular leprosy. Ophthalmoscopic lesions in lepers. (Lèpre oculaire. Lésions ophtalmoscopiques chez les lépreux.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(18) **Thompson, A. Hugh.**—Dilated pupil of Argyll Robertson type in a young girl showing well-marked contraction to closure of the lids. *Proceedings of the Royal Society of Medicine: Section of Ophthalmology*, December, 1914, p. 1.

(19) **Thompson, A. Hugh.**—Case of one-sided internal ophthalmoplegia. *Proceedings of the Royal Society of Medicine: Section of Ophthalmology*, December, 1914, p. 1.

(20) **Smith, E. Temple.**—Some modern developments in ophthalmology and the relationship of the specialty to general clinical medicine. *Medical Journal of Australia*, 5th December, 1914.

(21) **Stuelp, O.**—Upon the causal relationship of chronic eye diseases with the so-called "chronic" articular rheumatism, especially with osteo-arthritis and osteitis deformans. (Ueber den ursächlichen Zusammenhang chronischer Augenerkrankungen mit den sogenannten "chronischen" Gelenkrheumatismus, insbesondere mit der chronischen progressiven Polyarthritis ankylosans et deformans.) *Zeitschrift für Augenheilkunde*, Vol. XXXII, p. 341.

(22) **Willard, Lee M.**—Two cases of exophthalmic goitre with ocular muscle complications. *Ophthalmology*, January, 1915.

(23) **Woodruff, F. E.**—Complete left hemianopsia with glycosuria, result of slight trauma. *American Journal of Ophthalmology*, May, 1915.

(24) **Davis, A. Edward.**—The eye in relation to rheumatoid affections. *American Medicine*, June, 1915.

(25) **Campbell, Colin.**—The ocular manifestations of disseminated sclerosis, with report of a case. *Canada Lancet*, July, 1915.

(1) **H. Coppez**, of Brussels, had found in four patients suffering from Paget's disease, the following lesions of the eye.—The existence in the macular and perimacular regions of tiny yellowish spots of degeneration. These spots gave rise to metamorphopsia and to small scotomata. Sometimes they were accompanied by tiny punctiform hæmorrhages. Progress is slow. The spots become confluent, and terminate in the formation of an atrophic *plaque*. The optic nerve remains unaffected. In each of Coppez's cases there was commencing cataract. MARCEL DANIS.

(2) The conclusions come to by **Bradburne**, of Manchester, are, in his own words, as follow:—"The occurrence of nystagmus in labyrinthine affections proves that a relationship exists between the labyrinths and the ocular balance, that this relationship can be further logically assumed from the manner in which the conjugate centres can be expected to be influenced by the semi-circular canals. The examination of affected cases of disease of the labyrinth shows a majority of them causing an ocular disturbance in the maintenance of parallelism of the vertical meridians. That when

disease tends to invade the deeper parts in the neighbourhood of the auditory organ, an ocular imbalance follows, which is manifest in a difference in the elevation of the eyes." The article is accompanied by tables showing the ocular results in various cases of auditory disease. The author presses for further investigation on this subject, in the hope, more especially, that it will enable us to obtain evidence from the eye balance of the exact nature of some of the early stages of serious ear complications. ERNEST THOMSON.

(3) **J. A. Wilson,** of Glasgow, reports and figures a case of keloid of the eyelids which was observed after measles accompanied by severe corneo-conjunctival and cutaneous inflammation. The author concludes that this unusual condition was caused by the inflammation of the eyes that accompanies measles, acting on structures already irritated and abraded.

ERNEST THOMSON.

(4) **Benedict,** of Ann Arbor, has studied the ocular conditions of a number of psychopathic individuals, with a view to determining any relationship that might exist between the psychosis and changes found in the eye-ground by ophthalmoscopic examination. His conclusions are: (1) that well-defined disorders from extensive morbid conditions may exist for some time without ophthalmoscopic change appearing; (2) that cases of dementia precox show no associated disc change peculiar to this condition, whilst they show a higher percentage of normal fundi than do either the organic or the functional groups of psychoses; and (3) that in functional psychoses there is no definite association between the mental disorder and the ophthalmoscopic appearance of the eye-ground. R. H. ELLIOT.

(5) The account given by **Haas,** of the propagation of diphtheria from the nose to the conjunctiva—although apparently in a very attenuated form as regards this membrane—suffers greatly from the fact that the diphtheritic character of the membrane withdrawn from the nostril was not verified by an examination for micro-organisms. Nor was the urine examined. Basing upon the nasal false membrane, upon the history, and upon the general condition of the child (aged 5 years), an injection of anti-diphtheritic serum was given. On the following day, the child was very weak, and then the urine was found to be loaded with albumin. Forty-eight hours after the injection, the palpebral œdema, the nasal secretion, and the enlargement of the glands had disappeared, but, nevertheless, the child died. Haas considers that the albumin existed in the urine before the injection of serum. ERNEST THOMSON.

(6) **Brunetière**, of Bordeaux, records the case of a man, aged 30 years, without any specific antecedents, and with a negative Wassermann, who had a filaria loa under his conjunctiva, and, in addition to subsequent manifestations of filaroses (craw-craw and Calabar swellings), suddenly developed right hemiplegia, from which he recovered almost completely. The patient had a tænia for ten years, and had made frequent attempts to get rid of it, but did not succeed until after the attack of hemiplegia. The author rejects the theory that the paralysis was due to a cerebral cysticercus, owing to the patient's recovery, or to the abuse of tænifuges, because none had been taken for eight months before it occurred. There was a slight reduplication of the second heart sound, but no other sign of endocarditis, so the hypothesis of an embolism seems improbable. The author therefore considers that the hemiplegia was probably due to a blocking of the terminal ramifications of the left Sylvian artery, possibly by an adult filaria, but more probably by a mass of microfilaria. He cannot find any previous record of such a lesion.

R. J. COULTER.

(7) **Adams** quotes cases to illustrate his thesis that adenoids, by interfering

with the circulation in the pharynx, nose, and eyes, set up asthenopia, amblyopia, retinal hyperæmia, perivasculitis, and other fundus changes.

A. J. BALLANTYNE.

(8) **Claiborne,** of New York, met with a case in which optic atrophy appears to have been caused by a sudden and violent fit of anger. He enters into anatomical details to show that the lesion occurred "just posterior to the chiasm in the crotch formed by the divergent tracts," and he attributes the mischief to a violent congestion of the anterior lobe of the apophysis. He adds that the scotomata found in this case are "consistent with those found by others in apophysis disease." R. H. ELLIOT.

(9) **Patton,** of Omaha, reports three cases, from his own practice, of the condition usually known as "tower skull," but which he apparently prefers to describe as "tour skull." The literature of the subject is given, and the following conclusions are arrived at.—(1) Although this condition has been recognized since the days of Mackenzie, its ætiology is still far from being clearly established. (2) The gravity of the condition in its relation to vision should be early recognized, and a guarded prognosis given. (3) Radiographic studies are helpful in determining the amount of deformity in the region of the sella, chiasm, and orbital roofs. (4) Although the results of operation have so far been disappointing, yet in progressive cases decompression offers some hope of relief, which should always be offered. R. H. ELLIOT.

(10) **Lewis,** of Buffalo, draws attention to the widespread influence of the psychic element on the eye. The conditions of modern life, especially of modern American life, are such as to introduce the psychic factor into every domain of medicine, not excluding that of ophthalmology. Cases are given, and authorities quoted. In addition, Lewis contributes his own comments, which are of an interesting nature, on a subject which we do well to keep ever in mind. R. H. ELLIOT.

(11) **Welton,** of Peoria, records the case of a woman, aged 69 years, whose personal and family history indicated no tendency to mental aberration, but who became insane after glaucoma which had been treated by her physician with opiates for several months. The mental symptoms included loss of memory and intellect, insomnia, melancholia, and occasionally mania with suicidal tendencies, loss of orientation, and hallucinations of hearing.

The eyes, when seen by the writer, were very painful and in a state of absolute glaucoma, with scleral ectasia. Trephining relieved the pain, but, of course, there was no recovery of vision. What effect the operative treatment had on the mental condition is not recorded. J. JAMESON EVANS.

(12) Two brothers and a sister presented atrophy of the optic nerve following neuritis. The visual fields were contracted. The children showed the characters of hypothyroidism. Radiography disclosed no sign of any lesion of the sella Turcica. Organotherapy enlarged the visual field, but produced no change in central vision. MARCEL DANIS.

(13) So far as we have been able to gather, there is little or nothing in the article by **Pechin,** of Paris, of sufficient novelty to warrant abstraction for specialists. It appears to be a chapter written for a book on gonorrhœa by Georges Luys. ERNEST THOMSON.

(14) **Alexander,** of San Francisco, records an interesting case of typical migraine, with scintillating scotoma, upper right quadrantic hemianopia, nausea, and right-sided headache. Correction of an error of refraction (hypermetropic astigmatism) soon led to the disappearance of the severe headaches, while the premonitory visual symptoms still occurred occasionally in a modified degree. Another feature of the case was the persistence of a sector-shaped defect in the fields corresponding to the quadrantic defect that

accompanied the attacks. The symptoms seemed to point to a lesion situated at the cortical level. A. J. BALLANTYNE.

(15) **Hawley**, of Chicago, believes strongly that auto-intoxication explains many cases of eye strain and eye disease for which it is difficult to assign a cause. The evidence of auto-intoxication on which he bases a diagnosis are chiefly the urinary reactions for indican, skatol, etc., and for excessive acidity. He quotes cases of eye strain, iritis, and cyclitis, in which attention to diet and flushing out of the lower bowel have produced favourable results.
A. J. BALLANTYNE.

(16) **Beaumont**, of Bath, discusses the relationship which is held to exist between chronic rheumatism and iritis; although there is nothing new in the facts he presents, yet the paper is worth perusal as a sane, level-headed, and eminently readable exposition of the present ophthalmological position. His epigrammatic remark that "it is better to lose thirty-two teeth than one eye" is not likely to be soon forgotten. Almost equally good is the dictum, which occurs in connection with intestinal stasis, that "the teeth must suffer the penalty for guilt as accessories before or after the event."
R. H. ELLIOT.

(17) In leprosy **Trantas**, of Constantinople, has found fundus lesions resembling those of syphilis and tubercle but chiefly confined to the anterior part of the fundus and seen only by direct ophthalmoscopic examination while pressure is made on the ciliary region with the finger. Among a series of 101 lepers he found fundus lesions in 68 per cent. Of these 26 belonged to the type which he calls typical retinitis leprosa anterior (or perioraserratique); 16 belonged to the group of a typical anterior leprous retinitis (a choroidoretinitis); and 13 were disseminate choroiditis. All these changes were far forward, and made visible only by digital pressure on the ciliary region.

Other ocular complications of leprosy are: superficial punctate keratitis, in 43 per cent., chiefly of the tubercular form; deep punctate keratitis, in 26 per cent., chiefly of the anaesthetic form; parenchymatous keratitis, in 10 per cent., mostly of the tubercular form; episcleral-corneal leproma, in 31.5 per cent. of tubercular and mixed cases; iritis and iridocyclitis 39 per cent.; and a number of other conditions including madarosis of eyebrows and eyelashes, paralysis of the frontalis, lagophthalmos, and leproma of the eyelids. The statistical table shows that the typical anterior retinitis occupies a place alongside keratitis superficialis as one of the most frequent ocular lesions of leprosy. It is much more frequent than episcleral leproma, parenchymatous keratitis, etc., which are more often referred to. Even the fundus lesions, although readily visible with the ophthalmoscope, are frequently overlooked. A. J. BALLANTYNE.

(19) There was a history of syphilis in the patient whose case is reported by **A. Hugh Thompson,** of London.

(20) **Temple Smith**, of Sydney, deals in an interesting way with modern developments in ophthalmic medicine and surgery. After a word of praise for the service rendered by the electric ophthalmoscope and the Schiötz tonometer, Smith passes on to consider Elliot's operation of trephining for glaucoma (the *technique* of which he regards as more difficult than of iridectomy) and Bjerrum's test for early glaucoma. In the treatment of trachoma he warmly endorses Heisrath's excision of the tarsal plate. He makes the definite statement that the contagion of trachoma is often conveyed by flies. In discussing the intimate relationship that exists between ophthalmology and general medicine, the author holds strongly that under no pretext whatever should the ophthalmic surgeon dissociate himself from the general treatment of the patient. SYDNEY STEPHENSON.

(21) **Stuelp**, of Mülheim an Ruhr, communicates a long and ill-digested paper, which professes to be upon an ophthalmic subject, but in reality, after the first page, becomes entirely medical. The first page, however, is valuable because on it we find the view, now generally held by modern ophthalmologists, stated in the most categorical terms, that "rheumatic iritis" is not a clinical entity. Stuelp points out that many eye diseases were originally called "rheumatic," because the patients complained of rheumatic pains or suffered from so-called rheumatic arthritis. Later researches have shown that neither the eye symptoms nor the arthritides have any connection with rheumatism. There is only one true rheumatism, acute articular rheumatism, called in England "rheumatic fever." The bacterial cause of this disease has not yet been discovered, so Stuelp says, but clinically the disease is sharply differentiated from all other articular diseases. It reacts specifically to salicin compounds. It is characterised by a pronounced liability to heart complications; it does not tend to relapse, and never becomes chronic, the affected joints becoming absolutely normal. There is no such thing as a "chronic rheumatic joint"; such conditions are not rheumatic, but have other causes. The same may be said of the so-called rheumatic eye affections.

The remainder of the paper is occupied with a destructive criticism of Poncet, of Lyons, who is responsible for the view that osteo-arthritis is caused by tuberculosis. Stuelp reproduces most of Poncet's clinical histories and shows that in few, if any, of them is the tuberculous ætiology proved. We think that Stuelp's criticism is successful, but we wish that he had condensed his paper into one of four or five pages. The constant use of italics and of heavy type reminds one forcibly of a Victorian lady's love letter, and is about equally irritating. T. HARRISON BUTLER.

(22) The first case reported by **Willard**, of Warsau, Wisconsin, had paralysis of the right superior and the left inferior recti muscles, and paresis of the right external rectus. These muscular defects were much improved after operation on the thyroid. The second case had paralysis of the right superior and paresis of the right external recti. Similar great improvement followed operation on the thyroid.

The writer points out that such cases are not common. They are generally supposed to be nuclear. They are sometimes transient or variable, and are therefore believed (Posey) to be due to toxins. A. J. BALLANTYNE.

(23) The case referred to by **Woodruff**, of St. Louis, is that of a man of 66 years, who, after a stumble in the street, developed glycosuria and left hemianopsia with retention of the central field to 10 degrees. There were no other signs or symptoms. The blood pressure was 150. The diagnosis come to by the author is "a ruptured blood vessel on the mesial side of the occipital lobe in the region of the cuneus." ERNEST THOMSON.

(24) **Davis**, of New York City, enumerates iritis, cyclitis, episcleritis, scleritis, keratitis, sclero-keratitis. Tenonitis, muscular paralyses, optic neuritis, and even glaucoma, as some of the affections of the eye which "may have a rheumatic origin." The communication is devoted to a description of the symptoms and treatment of these various conditions.

SYDNEY STEPHENSON.

(25) **Campbell**, of Toronto, narrates a case which goes to show that "the most frequent prodromal symptoms of an incipient sclerotic change throughout the central nervous system is some transient disturbance of vision." His patient, a young woman, developed paresis of the left external rectus soon after an accident, slight optic papillitis, changes in the visual fields, and reduction of sight of one eye to hand movements. The affected eye was colour-blind to 10 mm. red and green squares, and to all colours when a 5 mm.

square was employed. The patient manifested general signs (tremor, hemi-anæsthesia on the left side, slightly increased reflexes, etc.), but not of a very marked or characteristic kind.

It is a pity that this brief article is marred by so many evidences of careless proof-reading. SYDNEY STEPHENSON.

II.—METHYL ALCOHOL INHALATION.

Tyson, H. H. and Schoenberg, M. J.—Changes in the blood and aqueous humour in methyl alcohol inhalation. *Archives of Ophthalmology*, Vol. XLIV, No. 3, May, 1915.

Tyson and Schoenberg, of New York, have found records of about 100 cases of amblyopia and death from the *inhalation* of wood alcohol, and are of opinion that this constitutes only a small percentage of the total cases which have actually occurred. They think that the profession and the laity alike have focused their attention on the evils following the imbibition of wood alcohol to the exclusion of the important effects which follow its inhalation alone. From 1880 to 1910 the amount of wood alcohol manufactured went up from 400,000 to 8,000,000 gallons. In the U.S.A. alone, 2,500,000 people work in trades which make use of it. These include painters, glaziers, varnishers, laundry workers, boot and shoe makers, barbers, printers, lithographers, wood-workers, piano and furniture manufacturers, dye-workers, brass-workers, cabinetmakers, gold and silver smiths, harness makers, hat-makers, tanners, metal-workers, photographers, bookbinders, chemists, and others. The contention that the refined spirit (known as "Columbian spirits") is not poisonous, is not only wrong, but this product is actually more dangerous than the unrefined article, as the absence of smell deprives the workers of the warning given by the cruder article. Experiments were made with guinea-pigs, rabbits, dogs, and a monkey; every effort being made to approximate the atmospheric conditions to those found under commercial conditions. The durations of exposure were varied according to what is known to hold in various trades. The injurious effect upon the eyes and general health was proportional to the amount of methyl alcohol used, the humidity and temperature of the air, the length of exposure, and the species of animal. The susceptibility was found to be greater the more highly developed the species. The blood changes were marked, all the elements except the lymphocytes showing a decided increase, and these being markedly decreased. There was evidence of acidosis in the blood, and also in the aqueous fluid. Methyl alcohol is a true hæmato-toxic; it damages all the tissues. Its toxicity is irrespective of whether it is inhaled or absorbed. R. H. ELLIOT.

III.—THE QUESTION OF ACCOMMODATION IN THE LENSLESS EYE.

Collins, E. Treacher.—Apparent accommodation with aphakia. *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 314.

Many ophthalmic surgeons have met with cases where after the successful removal of a cataract, the patient could read small print with the glasses that gave him good distant sight. In fact, series of such cases have been published by some writers, as Förster (1872), Woinow (1873), A. Edward Davis (1895), and Rogman (1899). It has even been thought from these observations that an aphakic eye may possess true accommodation. But it has been shown by Professor Hess that the reading of print is not a proof of exact accommodation, and there are numerous other fallacies in the deduction.

Collins, of London, has now placed us under an obligation by putting upon record a case of his own, and discussing the various explanations of the phenomenon that have been advanced from time to time.

Graefe (1855) believed that some power of accommodation remained to patients who had lost the crystalline lens, although he made the singularly acute observation that those who had given the most accurate and uniform statements possessed the least range. On the other hand, Donders (1864) stated in so many words "that in aphakia not the slightest trace of accommodative power remained." Donders commented upon the importance in these cases of taking into consideration the diameter of the pupil, since the last-named by altering the size of the diffusion circles, alters the visual acuity, and thereby allows the aphakic eye to discriminate. Such power of discrimination, as Donders pointed out, does not compel us to assume that true accommodation is present.

Aside from any particular explanation, a study of the literature shows that a number of cases have gone on record by competent observers where a lensless patient could see clearly at different distances without any change in either the position or the strength of the optical lens placed before his eye. This apparent power of accommodation was in some instances but slight, but in others it was great enough to be of practical value in allowing the patient to dispense with the necessity of using two pairs of glasses, one for distance and the other for reading. For example, in Collins' own case, to be now briefly described, it allowed full visual acuity both at a distance and also at the ordinary distance.

A boy, 7¾ years when first seen, was affected with zonular cataract of both eyes. Complete dispersion followed two "needlings" in the right and three in the left eye. Fourteen months after the last operation, R.E. + 13D. sph. =6/6, and L.E. + 13D. sph. =6/9. When the patient had reached the age of about sixteen years, it was found that he was using one pair of glasses for all purposes. On examination, R.E. + 13D. sph. =6/9 and Sn. 0.5 at 50 cm. and at 30 cm. L.E. + 13D. sph. =6/6 and Sn. 0.5 at 50 cm. and at 30 cm. The pupils, in response to a bright light, contracted to 3 mm. in diameter, and on dull illumination, dilated to 6 mm. There were no adhesions between iris and lens capsule, and the pupils were perfectly circular in outline. As to the opening in the capsule, in the right eye it was circular, possessed a diameter of 3 mm, and was little influenced by atropine. In the left eye the opening in the capsule was of roughly oval outline, was crossed by a delicate strand of tissue, and when under the influence of atropine, measured about 5 mm. vertically and 4 mm. horizontally. In order to ascertain whether the apparent accommodation could be attributed to an alteration either in the position or the curvature of the cornea, the lad was examined with Sutcliffe's ophthalmometer and with Batten's hydro-ophthalmoscope (continuous eye-bath), but with negative results in those respects. No alteration in the depth of the globes during vision of distant and near objects could be detected with the ophthalmoscope. After the application of atropine, the lad could read (with 13D. sph.) No. 4 J. with the right and No. 10 J. with the left eye. But when a strong light was projected on to the Jaeger type, he could read No. 1 with his right eye and words of No. 1 with his left eye. After the use of cocaine (with + 13D. sph.) the patient could read J. 1 with his right and J. 2 with his left eye.

Collins has satisfied himself by experiments and observations that in his patient the seeming power of accommodation was not induced by:—1. alteration of the position of the glasses on the nose; 2. pressure of the eyelids upon the eyeball; 3. lengthening of the globe by the pressure of the extrinsic muscles of the eye; 4. alteration in the curvature of the cornea; 5. retraction of the globe backwards, drawing it away from the glasses in front; 6. excentric vision through the spectacle lenses; 7. action of the ciliary muscle upon (a) the cornea, or (b) the vitreous humour.

The author believes that his patient's ability to see clearly at different distances was due to the cutting off of diffusion circles partly by the action of his active pupils, but chiefly by the sharply-defined central opening, secured by operation in the capsule of each lens, acting as a stenopaic aperture.

SYDNEY STEPHENSON.

IV.—CONGENITAL ANOMALIES.

(1) Höeg, Niels—"Grouped" pigmentation of the fundus. (Die gruppierte Pigmentation des Augengrundes.) *Klin. Monatsbl. f. Augenheilkunde*, January, 1911.

(2) Jackson, E.—Cilio-retinal and other anomalous retinal vessels. *Ophthalmic Review*, September, 1911.

(3) Lawson, Arnold.—A large patch of medullated nerve-fibres near the macula and apart from the optic papilla. *Trans. Ophthal. Society U.K.*, Vol. XXXI, Fasc. 3, p. 256, 1911.

(4) Greeves, R. A—A case of persistence of the posterior vascular sheath of the lens with absence of the nucleus. *Royal London Ophthalmic Hospital Reports*, Vol. XVIII, Part iii, July, 1912.

(5) Cosmettatos, G. F.—On the congenital remains of the anterior segment of the vascular tunic of the lens. (Des restes congenitaux du segment anterieur de la tunique vasculaire du crystallin.) *Ann. d Oculistique*, octobre, 1912.

(6) Werner, L.—Congenital abnormality of retinal vessels in the macular region. *Transactions Ophthalmological Society U.K*, Fasc. 3, 1912.

(7) Van der Hoeve.—Coloboma of the lens. (Coloboma lentis.) *Archiv f. Augenheilkunde*, Bd. LXXII, Heft ii, p. 145.

(8) Werner, L. Congenital anomaly of the iris, probably originating in a capsulo-pupillary membrane. *Transactions Ophthalmological Society U.K*, Fasc. 3, 1912.

(9) Clarke, Ernest.—An unusual arrangement of opaque nerve fibres. *Proceedings of the Royal Society of Medicine: Section of Ophthalmology*, June, 1913.

(10) Kruger, A. A congenital abnormality in the topographical relations of the posterior pole of the eye: the papillæ lie in the optital axis of the eye (Angeborene Anomalie der topographischen Verhaltnisse am hinteren Augenpole Die Papillen liegen in der Pupillarachse.) *Zeitschrift für Augenheilkunde*, July, 1913.

(11) Williams, Carl.—Hole in the disc. *Annals of Ophthalmology*, October, 1913.

(12) Streiff, J Remarks on Rübel's communication on "Congenital hypoplasia or aplasia of the anterior layer of the iris" (Bemerkungen zu der Mitteilung von Rubel uber "Angeborene Hypoplasie bzw Aplasie des Irisvorderblattes." *Klin Monatsbl f Augenheilkunde*, December, 1913.

(13) **Monesi, L.—A contribution to the study of congenital irido-corneal staphyloma. (Contributo allo studio dello stafiloma irido-corneale congenito.)** *Annali di Ottalmologia*, Vol. XLI, fasc. 1-2, p. 76 to 113 (with three illustrations).

(14) **Crampton, George S.—Two cases of binocular coloboma of the optic nerve in the same family.** *Annals of Ophthalmology*, January, 1914.

(15) **Coutela, Ch.—Colobomatous excavation of the papilla. (Excavation colobomateuse de la papille.)** *Archives d'Ophtalmologie*, janvier, 1914.

(16) **Begle, H. L. — A developmental anomaly of the inner lid margin. (Bildungsanomalie der inneren Lidkante.)** *Zeitschrift für Augenheilkunde*, March, 1914.

(17) **Henderson, E. Erskine.—Crater-like hole on the disc.** *Proceedings of the Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, July, 1914.

(18) **Armaignac, H.—A curious instance of hereditary family pterygium. (Curieux cas de ptérygion familial héréditaire.)** *La Clinique Ophtalmologique*, 10 juillet, 1914.

(19) **Calhoun, F. P.—Bilateral coloboma of the lens.** *Ophthalmology*, April, 1914.

(20) **Shoemaker, J. F.—A case of supernumerary eyelid.** *American Journal of Ophthalmology*, August, 1914.

(21) **Greeves, R. Affleck.—Two cases of microphthalmia.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIV, 1914.

(22) **Hudson, A. C.—Case of unusually extensive opaque nerve fibres.** *Transactions Ophthalmological Society U.K.*, 1914.

(23) **Mayou, M. S.—? Inflammatory ? congenital mass in the nerve head.** *Transactions Ophthalmological Society U.K.*, 1914.

(24) **Manson, J. S.—Congenital absence of both eyeballs.** *British Medical Journal*, May 8th, 1915.

(25) **Collins, E. Treacher.—Congenital ectropion of the lower lids.** *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 228.

(1) **Höeg** proposes the name "grouped pigmentation" for a peculiar aggregation of pigment in the retina, which he observed in four cases. Similar cases have been described by Jaeger, Sydney Stephenson, W. A. Frost, and H. E. Juler. Black or dark-grey spots, arranged in groups, occupy, as a rule, a sector-like portion of the fundus, the macular region remaining free. Spots and groups vary greatly in size and shape, but the former have usually a peculiar angular appearance, while the latter resemble frequently clusters of sarcinæ. Höeg insists upon the pigment being always deep to the retinal vessels. The condition is, no doubt, a congenital anomaly, non-progressive, without influence on the function of the eye, and in that sense, devoid of clinical importance. C. MARKUS.

(2) As the result of the examination of five hundred consecutive patients, **Jackson**, of Denver, found that cilio-retinal veins were very rare (only two cases), whereas cilio-retinal arteries occurred in 20 per cent. of all eyes

examined, and with equal frequency in the two eyes. It was also found that in normal conditions visible pulsation in these arteries is more frequent than in the branches of the central artery. A. H. PAYAN DAWNAY.

(3) **Lawson**, of London, found in one eye of a woman of 56 years a large irregularly-shaped area of opaque nerve fibres lying at some little distance from the optic disc. There was an absolute scotoma in the visual field corresponding to the patch. In position and shape the opaque fibres in Lawson's case present a remarkable likeness to one described by the reviewer in THE OPHTHALMOSCOPE, December, 1906, p. 672.

SYDNEY STEPHENSON.

(4) In this case by **Greeves**, of London, the nucleus of the lens and the posterior capsule had not developed and there was persistence of the posterior vascular sheath with the hyaloid artery, and the blood was carried away by a vein to the front of the lens and the iris. A. H. PAYAN DAWNAY.

(5) **Cosmettatos**, of Athens, recognises three parts in the vascular tunic which surrounds the crystalline vesicle during intra-uterine life: (1) the capsular membrane which clothes the posterior surface of the lens; (2) the capsulo-pupillary membrane which spreads from the equator as far as the limit of the secondary optic vesicle; and (3) the pupillary membrane which covers the part of the lens which is not covered by the secondary optic vesicle. The central part of this eventually forms the pupil. The capsular and capsulo-pupillary membranes are absorbed during the seventh month of intra-uterine life, but the pupillary membrane persists until the eighth month. The absorption of these membranes, however, may be incomplete, giving rise to opacities on the surface of the lens, which may be: (1) remains of the capsular membrane, (2) remains of the capsulo-pupillary membrane, and (3) persistent pupillary membrane.

In the article under consideration the author deals with the latter two classes only. Remains of the capsulo-pupillary membrane occur as points, lines, or spots of variable size and number, of a white, brown, or clear (*claire*) colour, situate at the periphery of the anterior lens capsule in an area corresponding to that covered during intra-uterine life by the secondary optic vesicle. These opacities do not interfere with vision, and unless there is a congenital or operative coloboma of the iris they cannot be seen through the undilated pupil. Opacities of this nature occurring in the pupillary as well as the peripheral parts of the lens capsule are regarded by the author as due to combined capsulo-pupillary and pupillary remains, and may cause reduction of visual acuity. Remains of the pupillary membrane may be in the shape of membranes, filaments, or small brown spots. The membranes and filaments start from the anterior surface of the iris, either at the periphery, the lesser circle, or the pupillary border, and are inserted on the anterior capsule, or, in rare cases, to the posterior surface of the cornea. These latter may be (*a*) pure congenital anomalies, or (*b*) due to intra-uterine inflammation. The punctiform remains occur as small brown spots scattered over the anterior lens capsule or collected into masses on it. When a persistent pupillary membrane is adherent to the posterior surface of the cornea, it causes a more or less extensive corneal opacity, and it may even happen that the filaments joining the iris to the cornea become absorbed, leaving only a corneal opacity, which in such cases has a brown colour.

The author refers to recorded cases of these anomalies, and reports fresh cases from his own practice. The article concludes with a discussion on the pathogenesis of the anomalies described, which should be read in the original.

R. J. COULTER.

(6) Under this title **Werner**, of Dublin, figures what he considers may be an "arterio-venous communication" similar to that described and figured by Seydel under the title "Ein Aneurysma arterio-venosum der Netzhaut." The right eye in Werner's case presented an extraordinary development of tortuous and greatly enlarged retinal vessels in the macular region.

By a strange enough coincidence, the reviewer saw what seems to be a quite similar case the very day before reading Werner's article.

ERNEST THOMSON.

(7) **Van der Hoeve**, of Groningen, reports the case of a patient who was sent to him for examination as regards his fitness for military duty. The patient, aged 19 years, stated his eyesight had been poor since his youth. On the right side, by focal illumination, one noted marked iridodonesis. With the pupil dilated, one saw on the nasal side, and a little above, that the lens was absent in about one-fifth of its part. The lens border was not convex, but had a saddle-like depression. With the *loupe*, the fibres of the zonule of Zinn were distinguished, and it was noted that these failed in the middle part. By the indirect method, the disc was doubled, large through the defect, and small through the lens. Monocular diplopia was absent. Accommodation with the right eye was small. It could not be made out whether the lens changed its astigmatism with accommodation.

Coloboma of the lens is not rare. Kampffer, in 1899, collected 132 cases. This case shows how even large colobomata of the lens may be missed, since if this patient had not been sent for examination, the defect would not have been seen. The patient was quite satisfied with his vision. According to von Hippel, more than half of the lens colobomas below are complicated by other colobomas. A number of opinions as regards ætiology are quoted. Deutschmann explains the condition by fœtal eye inflammation; Heyl, by diminished nourishment to the lens through failure of single vessels of the fœtal lens capsule. Hess believes the deficiency in the lens border is caused by the vessels of the tunica vasculosa lentis being preserved too long or in the existence of vitreous cords; while Becker attributes the cause to local insufficiency of the zonule of Zinn. This last theory during the last year received approbation from Hess and Isakowitz, who observed in their sections the zonula defects corresponding to the defects in the lens border. Wessely proved that iridectomy in the new-born rabbit would later cause lens coloboma. In the rabbit the zonular fibres are adherent to the iris, so that in iridectomy, they are cut through. With deficient pressure at this point, the lens grows smaller and a coloboma develops. Wessely also found that where a scar was formed, the zonule fibres were stretched and there appeared instead of a defect, an excrescence of the lens. Van der Hoeve compared by weight the lens of rabbits with coloboma and without. His conclusion was that in all the rabbits with coloboma the weight of lens was less than that of the other lens. In the case reported there were no signs of fœtal inflammation. The zonular deficiency may be the cause of the lens defect. Wessely found in his first rabbit that the fibres were absent only from the middle of the coloboma. This was also true in this case. From Wessely's important experiments it is shown that lens colobomas appear through zonular insufficiency, but it is yet uncertain by what congenital colobomas the zonular insufficiency appears.

HANFORD MCKEE.

(8) In this case, by **Werner**, of Dublin, two pointed triangular tags of iris tissue were drawn out from the region of the corona, to become attached together to a small white dot of thickened capsule, or organised exudation. The pupil margin was quite free under the adherent tags of iris. The eye had never been inflamed. The author supposes that a capsulo-pupillary

membrane underwent a process of subsequent shrinking, and so drew some of the iris tissue near the corona, towards the point where the membrane adhered to the capsule. The condition is shown in a figure.

ERNEST THOMSON.

(9) A fine coloured plate by A. W. Head, illustrates the remarkable case of opaque nerve fibres shown by **Clarke**, of London.

(10) **Krüger**, of Cottbus, has had the good fortune to examine a case in which both papillæ were placed in the optical axis of the eye. There was a convergent strabismus of the left eye and nystagmus which increased when an attempt at fixation was made. The corrected vision was 5/20 and 5/30 right and left. When one eye was fixed upon an object, the other being closed, there was a divergence of about 20°, an enormous angle *gamma* (or "*Kappa*," as Landolt calls it) being present. Ophthalmoscopically, the papillæ were both centrally placed in the situation of the normal macula. The maculæ were not specially differentiated, but the distribution of the vessels suggested their situation. The fields of vision were not contracted.

T. HARRISON BUTLER.

(11) **Williams**, of Philadelphia, reviews the reported cases of "hole in the disc," and adds another of his own, which is unusual in that it was found in a child, whilst the previously reported cases have, so he says, all been in adults.* In other respects the case followed the majority of those already on record, for the hole was unilateral, oval in shape, pigmented, and lay in the outer segment of the disc. A coloured plate accompanies the paper.

R. H. ELLIOT.

(12) **Streiff**, of Genoa, discussing the paper of Rübel in the same journal for August, 1913, would bring Rübel's case into line with his views regarding a certain class of congenital anomalies of the iris. He believes that the stroma of the iris is developmentally composed of two layers, the anterior one directly continuous with the pupillary membrane, and that defects of this anterior layer may exist without abnormality of the deeper layer of the stroma or of the pigment epithelium. The defects in question are not sector-shaped but rather "pupillocentric," and, in the author's opinion, are the result of excessive involution implicating this part of the iris stroma along with the pupillary. They are therefore not due to defect of development in the strictest sense.

A. J. BALLANTYNE.

(13) This study by **Monesi**, of Piacenza, is interesting, especially from the anatomico-pathological point of view. The cornea, iris, and a portion of the ciliary region of the eyeball, removed by anterior amputation, showed the results of a grave inflammatory process, which one must admit had developed during the later period of intra-uterine life, and which had commenced in the uveal tract. The father of the patient was syphilitic (chancre at the age of 17 years, and oculo-motor paralysis at the time of the operation upon his son, aged 18 years), and the mother had had eight miscarriages and a baby dead at some months.

A. ANTONELLI.

(14) **Crampton**, of Philadelphia, describes coloboma of the optic nerve entrance as one of the rarest of congenital anomalies, especially if unassociated with a defect of the surrounding choroid. He reviews the literature of the condition, and gives the clinical notes of two cases of his own, both bilateral, in a brother and sister. The paper is well illustrated by coloured and other plates.

R. H. ELLIOT.

(15) **Coutela** describes a case of pure coloboma of the disc without similar malformations of the uveal tract.

[illegible]

The patient's right (good) eye was normal in every respect, save for a low degree of myopia, on correction of which its vision was normal.

On the left side there was an appreciable ptosis of congenital origin, the lid drooping to half-way down the pupil. Some action of the levator palpebræ superioris was present. The eye itself was strabismic 25° out and 10° down, with slight general limitations of movements. The media were clear, affording a good view of the fundus. The central part representing the papillary area was slightly oval in shape and of a steely-grey colour with bluish reflexes. Below and to the outer side of this was a fibrous band separating in two segments, supero-external and infero-internal. The papilla itself was represented by an excavation of more than 3 mm. in depth, limited by a scleral ring rather larger than normal, at the level of which numerous vessels emerged. A large staphyloma surrounded the central part, studded, especially on the nasal side, with pigment. Small pigmented spots were scattered close by in the fundus. The more peripheral parts of the fundus were normal. Myopia of 18 D. was present, but on correction of this, vision was barely equal to hand-movements.

The author is inclined to Deutschmann's theory that infection causes an arrest of development in fœtal structures, but he asks whether such a voluminous excavation is to be regarded as a congenital malformation or a large physiological excavation. In practice so many grades between the small physiological cup and the extensive congenital excavation of the papilla are met with. BERNARD CRIDLAND.

(16) **Begle**, of Detroit, working at Prague, describes two cases of an anomaly of the upper lid margin. Both eyes were similarly affected. The inner lid margin was completely rounded off. In its place there was a zone 1½ mm. broad. This zone was covered with a thin membrane-like mucous membrane irregularly vascularized. Through this could be seen several tube-like, bright-yellow structures, which in colour suggested Meibomian glands. No orifices to these tubes could be seen, but the presence of a secretion upon the membrane showed that such must exist. The boundary of this zone towards the tarsal conjunctiva was formed by a white cicatricial-like line. A woodcut explains the condition far better than the somewhat involved description. An account is given of the histology.

T. HARRISON BUTLER.

(17) **Henderson**, of London, adds another to the growing list of these abnormalities. The note is accompanied by a drawing and a bibliography.

(18) **Armaignac**, of Bordeaux, publishes this somewhat extraordinary family history with a view to aiding in the solution of the mystery of pterygium. As he says, the ætiology of the malady is absolutely unknown. So far as he is aware, no one in France has drawn attention to the question of heredity in pterygium, although an American *confrère*, whose name Armaignac has forgotten, wrote to him several years ago seeking information on the subject.

Armaignac, then, considers that the most probable cause of pterygium is a hereditary trophic disturbance.

Not to occupy too much space, the family history may be abbreviated by saying that it is composed of twenty-two persons in three generations. Of these, nine have either been lost sight of or died in infancy. Of the remaining thirteen, eight have or have had pterygium. The proportion may yet become greater as the third generation grows up. At least two out of the eight had quadruple pterygium. It has not been possible to attribute the occurrence of these cases to any of the ordinary causes, and Armaignac is convinced that it is a case of hereditary transmission of a blemish (*tare*) of anatomical, pathological, or cosmetic character, such as one sees so often, and of which the real nature remains profoundly mysterious.

ERNEST THOMSON.

(19) **Calhoun**, of Atlanta, U.S.A., reports several cases of coloboma of the lenses. Chief interest centres in a case with bilateral senile cataract, in which each lens, on removal, presented a defect in its lower-inner border.

A. J. BALLANTYNE.

(20) **Shoemaker,** of St. Louis, reports a very interesting case in which a growth of irregular outline was situated at the inner canthus in the region of the caruncle, protruding between the lids about 5 mm. It was attached in the region of the caruncle and was only attached to the lower lid by a narrow band almost at its junction with the upper lid. The punctum and canaliculus were not involved. The growth was removed. The lower lid had a very small notch in its edge to the temporal side of where the growth was attached to it. The author is in doubt whether this notch represents a coloboma on the lid or has been caused by pressure of the growth.

The anatomical examination was made by Alt, and, in view of the rarity of the case, we shall transcribe Alt's description pretty fully. "Microscopically the growth is made up of all the elements found in the caruncle and lid, but particularly in the latter, arranged in an abnormal manner. . . . . . . It appears as if the supernumerary lid was grown out from the caruncle. The lid portion, which is 6 mm. long, is covered with cutis and bristles with fine and coarse, partly pigmented, eyelashes, which grow in all directions. Between them are numerous small sebaceous and modified sweat glands, held together by dense connective tissue. Farther back there are a number of atypical glandular structures which, however, easily recall the arrangement of Meibomian glands, although neither the glandular acini nor the apparent excretory ducts have a continuous lumen. They are mostly solid epithelial structures which show a lumen only here and there. There are also a number of bundles of muscular fibres in this part irregularly distributed among the other structures. Just where the lid portion and the caruncular portion join each other there is an opening into the depth of the tissue, which from the character, arrangement and thickness of its epithelial lining, is easily recognised as a lacrimal canaliculus. Following this up in the different sections it is found to end with blind sac (*sic*) lined with the same epithelium in the depth of the tissue of the lid.

"The caruncular portion shows all the elements of the normal caruncle, hair, sebaceous glands and a sweat gland embedded in dense connective tissue, but not arranged in the normal manner. A most peculiar cone of epithelial cells, with its base on the surface, reaches for quite a distance into the depth. The cells of this cone look very much like the cells of a Meibomian gland; there are, however, no glandular acini, neither is there a lumen. Near the base of the growth, where it was cut off, there is in some sections a second such epithelial cone.

"I can find no mention of such or even a similar anomaly, and I surely do not dare to offer an explanation of its manner of growth; but, certainly, it is a supernumerary eyelid, grown from, upon, or out of a somewhat abnormal caruncle."

ERNEST THOMSON.

(21) The two cases of microphthalmia very fully described by **Greeves,** of London, do not lend themselves to useful abstraction. The paper is illustrated by two photomicrograms.

(22) **Hudson,** of London, describes and figures a case of very extensive opaque nerve fibres in which no scotoma corresponding to these fibres could be detected.

ERNEST THOMSON.

(23) The description of this case by **Mayou**, of London, is accompanied by a coloured drawing. The following is the description : " Around the disc there is a pinkish white mass which is raised around the disc and below sticks forward in a large mass into the vitreous. The retinal vessels pass over the mass and are much twisted and in the loops somewhat hidden by being buried in the mass. The edges of the discs (? misprint for disc) are blurred and ill-defined. The condition is one which rather suggests an inflammatory origin, possibly obsolescent tubercle of the choroid in the neighbourhood of the optic nerve, but there is little proof of this beyond the family history, as there is no other evidence of tubercle elsewhere in the body." ERNEST THOMSON.

(26) The condition described by **E. Treacher Collins**, of London, was met with in a baby affected with partial ptosis and well-marked epicanthus. The lower lids seemed too voluminous to fit in close apposition, as they should do, to the eyeball. They stood away, so to speak, from the globes. When they were shut, the lower lids came outside the upper lids as regards the outer part. When the child was about five years old, the defect was remedied in one eye by a simple operation.—A wedge-shaped piece of the whole thickness of the lower lid, a little way external to the outer canthus, was removed. The base of the wedge, which measured about 6 mm. in length, lay at the free margin of the eyelid. The two raw surfaces were united by a suture inserted just inside the line of the cilia. It is interesting to note, in conclusion, that the musculus Riolanus was found, when examined microscopically, to be well-developed. SYDNEY STEPHENSON.

V.—EYE AND TEETH.

(1) **Terson, A.**—The dental ætiology of certain affections of the eye. (L'étiologie dentaire de certaines affections des yeux.) *Journal Méd. de Bruxelles*, 4 avril, 1912.

(2) **Obarrio.**—Persistent conjunctival hyperæmia, after cataract extraction, and its cause. (Hiperhemia conjuntival persistente, a la extraccion de la catarata y su causa. Resena de seis casos.) *Anales de Oftalmologia*, Julio, 1912.

(3) **Polet.**—Disturbances of the eye as the result of dental affections. (Les troubles oculaires, suites d'affections dentaires.) *Annales Belges de Stomatologie*, novembre, 1912.

(4) **Pont, A.**—Visual disturbances coming on during a dental operation and disappearing after extraction of the tooth. (Troubles visuels survenus au cours d'une intervention dentaire et ayant disparu après l'extraction de la dent.) *La Clinique Ophtalmologique*, 10 décembre, 1912.

(5) **Würdemann, H. V.**—Orbital and ocular neuralgia due to dental irritation. *Ophthalmic Record*, November, 1913.

(6) **Dutrow.**—Reflex ocular disturbances due to impacted third molars. *Ophthalmic Record*, May, 1915.

(1) The influence of an eye affection upon the teeth is quite exceptional and secondary. On the contrary, affections of the eye and its adnexæ connected with an affection of the mouth are of very great importance. Dental conditions may lead to obstinate spasm and paralysis of the eyelids, to abscesses in the lower eyelid, simulating acute dacryocystitis, to rebellious lacrymation, and, rarely, to iritis and ulcerative keratitis. Optic neuritis with, and sometimes without, sinusitis, may be dependent upon a peridental infection. Maxillary sinusitis may provoke detachment of the retina or a retinal hæmorrhage. Extraction of a tooth may be responsible for infective choroidal metastases. Disturbances of sight, varying from paralysis of accommodation to bilateral amaurosis, may have a dental origin. **Terson** states that the initial vaso-motor disturbance of glaucoma may exceptionally follow or become exacerbated by a dental lesion. Lastly, as complications of a dental affection, paralyses and contractures of the muscles of the eye and orbital infections may occur. Briefly, the chief dental causes of eye disturbances are peridental infection and the extraction of teeth. MARCEL DANIS.

(2) In this paper **Obarrio** records six cases in which cataract extraction was followed by persistent conjunctival redness, which resisted all the usual remedies and was relieved only by the removal of some decayed teeth on the same side. HAROLD GRIMSDALE.

(3) Bucco-dental infections and irritations may set up disturbances of the eye, following the venous, osseous, sub-periosteal, or nervous route.` In the course of the first and the second dentition one may observe kerato-conjunctivitis, lacrymation, and spasmodic contraction of the facial muscles. These same accidents are even more frequent during eruption of the wisdom teeth. In the course of dental caries we may see: reflex amblyopia with contraction of the periphery of the visual field, mydriasis, myosis, spasm of the accommodation, orbital neuralgia, paresis of the third pair, blepharospasm, inflammatory lesions of the cornea, of the iris, and of the choroid, and hypertony. Periostitis may lead to abscess of the orbit, sinusitis, embolism, and abscess of the frontal lobe with atrophy of the optic nerve.

MARCEL DANIS.

(4) This article, written by a dental surgeon, **Pont**, of Lyons, refers to sudden obscuration of vision during the course of manipulation of an upper lateral incisor. A probe had been passed into the canal of the tooth, when it suddenly perforated the wall of the root. This was accompanied by very severe pain radiating about the orbit, and soon afterwards, the patient exclaimed that she could not see with the eye of the same side. Vision was found to be foggy, while fingers and letters appeared deformed and enlarged. The root was immediately extracted, and soon afterwards, vision became normal. The author says of this phenomenon, "The visual disturbances observed in this patient are manifestly due to puncture of the alveolo-dental ligament by the end of the probe, and from this point of view the observation may be considered really as a laboratory experiment." Since the sole eye condition, objectively noted at the time, was that the right pupil was slightly dilated—which might have been due to other causes—we venture to suggest that the author is not very happy in his comparison with "a laboratory experiment." He goes on to say that this observation is conclusive proof, if such proof were necessary in face of numerous published facts, of the existence of eye disturbances in dental affections; but he makes no suggestions as to what the precise cause of the transient interference with vision may have been in this case. S. E.

(5) **Würdemann**, of Seattle, records the case of a man who suffered constant pain at the back of the left eye for about a year. When seen he

the writer, there was congestion of the nerve head, contraction of the visual field, and some blurring of vision. All the symptoms were immediately and permanently relieved when a carious gold-capped molar was extracted.

J. JAMESON EVANS.

(6) **Dutrow** describes an interesting case of severe ocular and general disturbance arising from impaction of molar teeth. The symptoms were severe headache, followed by vomiting, which relieved the headache temporarily. Complete paralysis of the left external rectus muscle, and elevation and rotation inwards of the right eye, due to spasmodic contraction of the superior rectus and the superior oblique. The fundi were normal. There was no specific history, and the Wassermann reaction was negative. Skiagrams showed impaction of the third molars, which were so situated that eruption was a physical impossibility. Within a few days after the extraction of the erring molars, the patient was improved generally, and within a month, all the ocular and general symptoms had entirely disappeared. Previous to the discovery of the impacted molars, treatment by glasses and strychnine and the resection of a deflected nasal septum had been tried unsuccessfully. J. JAMESON EVANS.

VI.—THE RELATION OF THE EYES TO RIFLE SHOOTING.

(1) **Scherer, A.—Researches upon the requisite visual acuity and refraction of Infantry. (Untersuchungen über die Anforderungen an Sehschärfe und Refraktion der Infanterie.)** *Zeitschrift für Augenheilkunde*, September and October, 1911.

(2) **O'Connor, Roderic.—The relation of the eyes to rifle shooting.** *Ophthalmology*, July, 1915.

(1) The paper, by **Scherer**, of Basle, first considers the regulations of the various European States regarding vision in the armies. The usual minimum corrected vision appears to be about 6/12 in one eye, which in some cases may be either eye, but in Switzerland must be the right. The English regulations are not mentioned, but we believe that 6/24 uncorrected vision is accepted and that glasses are not worn. All Continental armies permit the use of spectacles, but the regulations are stricter with regard to cylinders, because such spectacles are difficult to replace when broken.

Scherer finds, as the results of certain experiments he made, that no acuity under 0.1 is of much value at the distances at which modern battles are fought. But as these experiments were made with individuals rendered artificially myopic with lenses, they have little value. A myope of 2·5 D., with an uncorrected acuity of 6/60 only, is hardly handicapped at all in his perception of the nature of a countryside, a matter on which we speak from personal experience. One with 6/12 vision would be perfectly capable of most of the duties of a soldier. An artificial myope of 2·5 D. would be in a very different position.

The astonishing fact is noted that soldiers who wear spectacles shoot better than those who do not in the proportion of 64 to 61·2! This is due to their superior intelligence. Scherer suggests that, on a campaign, spectacles consisting of a disc perforated with holes should be carried by the soldiers to replace broken spectacles. Such an apparatus gives good acuity, and is not clouded by rain nor easily broken.

Visual acuity has an important relation to the quality of marksmanship, but many men of poor vision shoot well at a target,

The paper is worthy of consideration by our Army Authorities.

T. HARRISON BUTLER.

(2) **O'Connor** has an instructive and exhaustive article on the ocular functions involved in shooting and their relations as regards sighting and estimation of distance. The article should be read in the original by surgeons who have to examine recruits, and by those who are interested in shooting.

Summary of facts.

1. The necessity of focusing the three points—target, front and rear sights, and

2. The ability to make rapidly the necessary change of focus from one to another of these three points.

3. Alignment once being secured:

(*a*) The sights furnish the diffusion images—being seen by indirect vision.

(*b*) The bull's-eye, more especially its lower edge, is seen clearly and by direct vision.

Summary of essentials necessary for best results.

1. Normal distant vision in order to—

(*a*) Allow of locating accurately the mark.

(*b*) Assist in distance estimating.

2. Sufficient accommodative power to allow of a clear focussing of rear sight.

3. Normal colour perception as an aid in—

(*a*) Locating the object.

(*b*) Perceiving details

(*c*) Estimating distance.

4. Binocular vision in order to estimate distances more accurately.

Optical aids to marksmanship.

A. Black sights to prevent blurring by irradiation of light from them.

B. Lenses.

1. Those correcting refractive errors must be absolutely accurate and best prescribed after refraction under atropine mydriasis as a more accurate correction of any astigmatism is thus obtained. The best method is to correct all the astigmatism and then give the spherical correction, while case is sighting at a mark, with the rifle, up to the clearest view of the mark. This allows for the fact that in aiming one cannot look through the optical centre of the lens as ordinarily placed and also for the fact that refraction is different through the periphery of the lens.

2. Amber lenses are of value—

(*a*) By diminishing glare, thus preventing tiring from excessive contraction of the pupil.

(*b*) By cutting out to a great extent the irritating actinic rays of light.

(*c*) By lessening the irradiation of white portion of target over the bull's-eye thus allowing the latter to stand out clear, sharp and apparently larger.

(*d*) By not cutting down to any noticeable extent the actual illumination.

(*e*) By assisting in bringing out slight contrasts in shades of green, which are those chiefly encountered in nature, and consequently on dull days everything is actually brightened.

C. Rear sights.

1. Disadvantages of present rear sight :—

(*a*) The necessity of aligning three points.

(*b*) The necessity of accommodating to see it, which is a strain even to the normal, and impossible for the presbyopic eye.

(*c*) The comparatively short distance between the two sights, thus lessening accuracy of aim.

(*d*) The difficulty in rapidly finding point of aim and front sight through the peep due to the fact that it affords, through it, a field of vision of but one foot for each 100 yards of range.

2. Advantages of peep sight close to the eye.

(*a*) Only necessary to align two points, target and front sight, the mere act of looking through the peep aligning it.

(*b*) No strain put on the accommodation as it becomes unnecessary to focus even the front sight, hence presbyopes have no difficulty.

(*c*) The corrective effect of the small aperture on spheric aberration and circles of diffusion, thus aiding those who have reduced vision.

(*d*) Allows of more rapid aiming because of advantages (*a*) and (*b*) and because a much greater field of vision is permitted. A one millimetre aperture one inch from the eye affords a field of about eleven feet per 100 yards of range. In addition, no time is lost finding the rear sight. With the sight one half inch from the eye the above field would be doubled.

(*e*) Increased accuracy of aim because of greater distance between sights.

(*f*) Reduction in amount of glare.

(*g*) Prevention of side views and lights.

(*h*) The possibility of incorporating amber glass or correcting lens with sight, thus insuring accurate and permanent centreing.

The problem of locating the peep sight as recommended is one for ordnance experts, but optically there is no doubt whatever but that the place for it is as close to the eye as possible. It would be simplified by omitting the knurled cocking head and by lengthening the stock which at present is too short for the average man. This shortness produces too much bend at the wrist for the free play of the tendons of the forearm muscles, for it must be remembered that the trigger-pulling muscles are in the forearm.

With the distance between sights so greatly increased the barrel could be shortened and still maintain the present accuracy. This would be of advantage to the cavalry arm. The alteration necessary to place the sight where recommended may be considerable, but every consideration of drill, etc., should give way to an increase in the usefulness of the rifle.

Recommendations as to visual requirements.

1. For the line of the army, the signal and engineer corps.

(*a*) 20/20 in each eye.

(*b*) Binocular vision.

(*c*) Normal colour perception.

(*d*) Sufficient accommodation to allow a clear focus at 8 inches from the eye—this does away with the necessity of setting a limit to the degree of hyperopia for different ages.

(*e*) Eyes must be free from disease and from asthenopia.

2. For officers, cadets, hospital corps, ordnance, subsistence and quartermasters departments any degree of defect in either eye *provided* there is no *ocular diseases* and that *normal distant* and *near vision* may be secured by the use of *proper correcting lenses.* These various classes do not take part in firing in battle, consequently there is not the same need for normal eyes and

besides they are in a better position to take care of lenses. It requires but a low degree of myopia to reduce distant vision greatly, while a high degree of hyperopia, which is more apt to cause headaches, etc., may be overcome, in the young, by the accommodation, and yet at the end, when the accommodation fails, the vision is reduced to the same extent as in myopia. *A young officer wearing glasses for myopia is just as useful as an old one wearing them for hyperopia.* Finally, officers are required to carry field glasses, and so are not helpless in case they lose or break their glasses.

VII.—DISLOCATION OF THE CRYSTALLINE LENS.

(1) Jacqueau.—Spontaneous luxation of both transparent lenses into the anterior chamber. (Luxation spontanée dans la chambre antérieure des deux cristallins transparents.) *La Clinique Ophtalmologique*, 10 juin, 1911.

(2) Pons.—Spontaneous dislocation of the lens into the anterior chamber. (Luxation spontanée du cristallin transparent dans la chambre antérieure.) *L'Ophtalmologie Provinciale*, avril, 1912.

(3) Pissarello.—Contribution to the study of bilateral congenital ectopion of the crystalline lens. (Contributo allo studio dell' ectopia lentis congenita bilaterale.) *Annali di Ottalmologia*, Vol. XLI, fasc. 1-2, p. 56 to 65.

(4) Ask, Fritz.—The treatment of luxations of the lens. (Zur Behandlung der Linsenluxationen.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1913.

(5) Würdemann, H. V.—Spontaneous dislocation of the lenses, with report of a case exhibiting the pathological anatomy of the ligament of Zinn. *Ophthalmology*, October, 1913.

(6) Wray, Charles.—The treatment of dislocation of the lens. *Transactions Ophthalmological Society U.K.*, Vol. XXXIV, 1914.

(7) Wray, Charles.—Traumatic dislocation of the lens. *Proceedings Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, July, 1914.

(8) Spicer, W. T. Holmes.—Spontaneous dislocation of the lens into the anterior chamber in three members of the same family. Ectopia of the pupils. Extraction of the dislocated lenses *Transactions Ophthalmological Society U.K.*, Vol. XXXV, 1915, p. 353.

(1) Surely the case reported by **Jacqueau**, of Lyons, must be among the most remarkable in literature:

A man, aged 32 years, without pathological antecedents, and without any congenital malformation, had up to his twentieth year perfectly good sight, as judged by the standard of other people. Towards the age of twenty, he developed myopia, and was treated by three different competent ophthalmologists, none of whom discovered anything beyond the myopia. When aged twenty-five, he had a severe fall from a bicycle, but noticed no change in the vision as a result. In 1908 this patient first consulted Jacqueau, who found myopic astigmatism and corrected it as follows:

R.E. − 11D. sph. ○ −4·5D. cyl. 180°, V.A. = 1/3 barely ; L.E. − 4.5 D. sph. ○ − 2D. cyl. 180° V.A. = 5/7. A slight tremor of the iris on each side caused the author to warn his patient of the possibility of luxation of the lenses. On 6th October, 1910, the right lens became dislocated into the anterior chamber while the patient was stepping out of a bath. The eye became glaucomatous, owing to some slight delay, and then, under general anæsthesia, the lens was extracted without any loss of vitreous. There was found, unfortunately, a vitreous hæmorrhage which, up to the time of writing, had not completely absorbed. On the 21st of December of the same year the lens of the left eye dislocated into the anterior chamber while the patient was walking along the street, without any trauma and without any pain. Extraction was performed the next day under general anæsthesia. There was a slight loss of vitreous. V.A. of this eye was actually improved.

In discussing the pathogenesis, the author considers that there must have been a congenital weakness of the zonule, which latter gradually stretched by the weight of the lens up to the point of actual rupture. He was, in fact, able to watch part of this process during the interval between the two dislocations ; the left lens being observed gradually to sink and to expose its upper border. Jacqueau remarks that although he was prepared for the second dislocation, he was not prepared for it occurring into the anterior chamber exactly as in the other eye.

ERNEST THOMSON.

(2) **Pons** relates the case of a farmer, aged 40 years, with dislocation of the right lens into the anterior chamber. He has been able to find little or no literature on the subject. Four years previously his patient suffered from the same condition in the left eye. Pons believes that the dislocation is due to liquefaction of the vitreous and atrophy of the suspensory ligament. Other factors must be taken into consideration, for example, myopia, choroidal disease, senility, and deficient vitality. P. A. HARRY.

(3) The patient whose case is reported by **Pissarello**, of Turin, was very thin and badly nourished, with ogival palate, deviated uvula, nasal obstruction, pigeon breast, rachitic rosary, epispadias, varicocele, and some testicular atrophy. At the seventh month of pregnancy, the mother had sustained a severe fall upon the abdomen. The transparent lenses were subluxated, their infero-temporal part being still in place, while the supero-nasal border was visible in the pupillary field. No characteristic ophthalmoscopic lesions. High (about 21 D.) axial myopia. Acuity of vision satisfactory. Visual field normal. No diplopia, monocular or binocular, but it could be provoked by covering one half of the pupillary field with a red glass, and in this way the optical conditions could be studied. A. ANTONELLI.

(4) Basing his remarks on an experience of some 59 cases, **Ask**, of Lund, Sweden, gives a fairly complete account of the different forms of luxation of the lens, their complications, and their treatment.

His principal conclusions as to treatment are as follows.—In cases of *sub*-luxation, if the eye is quiet, tension normal, and the lens clear, it is safe to correct the refraction and to await events. Troublesome diplopia may be overcome by the use of an opaque glass. It is possible that the partial may go on to total dislocation. If the lens is cataractous, it should be extracted early, or discission may be employed. Iridectomy may be done before, or along with, the extraction. Depression of a partially luxated lens is not to be recommended. If the eye is persistently inflamed and extraction is impossible or unsuccessful, enucleation should be done. For secondary glaucoma, extraction combined with iridectomy is required, or trephining may be tried.

Where there is total luxation into the vitreous, an attempt should be made to remove the lens, especially if it can be brought into the anterior chamber. Combined extraction or trephining should be done if there is glaucoma, but this complication or iridocyclitis may require enucleation.

If the lens is in the anterior chamber it should be extracted as soon as possible.

In subconjunctival or other extra-ocular luxation, the author holds, contrary to the general opinion, that there is great danger of sympathetic ophthalmitis. He thinks that the danger of this has not been sufficiently realised, but he has proved it to his own satisfaction, both clinically and pathologically. He therefore advises extraction of the dislocated lens. One should not delay to allow time for the closure of the scleral wound. As a matter of fact, the presence of the lens often prevents closure taking place.

A. J. BALLANTYNE.

(5) After describing the development, anatomy, and physiology of the zonule of Zinn, **Würdemann**, of Seattle, classifies the different forms of displacement of the lens into ectopia lentis, spontaneous luxation, congenital dislocation, and traumatic dislocation. He then describes in detail a case of double dislocation, either spontaneous or congenital, in which it was possible to see very clearly the structure of the suspensory ligament, some of the visible fibres being intact and some ruptured. The lenses in this case became opaque, and were successfully removed without loss of vitreous and with a good visual result.

A. J. BALLANTYNE.

(6) **Wray**, of London, reviews the main facts as to the treatment of congenital dislocation of the lens.

An interesting discussion took place which does not lend itself well to abstraction. The principal points seem to be (1) that a lens dislocated into the anterior chamber must be removed by operation, or, at any rate, it is the surgeon's duty to attempt it. (2) In the case of other dislocation a great deal depends upon the circumstances of the individual case whether operation should be attempted, and if so, what particular operation. Thus, under certain circumstances the President (F. R. Cross) advises couching. R. H. Elliot does not think couching justifiable, and gives a picturesque account of the Indian coucher. Landolt fixes the lens with a needle from behind, then makes the corneal incision and extracts the lens with a Taylor's loop, while an assistant removes the needle.

Wray himself deals, among other points, with those cases of subluxation in which the aphakic part of the pupil has to be used for visual purposes, and in which contraction of the pupil under strong light interferes with vision. In such cases the question of an optical iridectomy may arise.

It is possible to obtain an artificial pupil by a safer method than any in common use. The fullest possible dilatation of the pupil is effected by means of euphthalmin, after which a knife-needle is introduced 2.5 mm. from the corneal margin and passed under the iris. The cutting edge of the knife is then turned forward, and the iris cut against the cornea. The same operation is applicable in *iris bombé* when an ordinary iridectomy is dangerous.

The article and the discussion upon it will be of considerable value to any surgeon who happens to be in doubt as to the correct procedure in any particular case of this kind.

ERNEST THOMSON.

(7) A blow with a tennis ball on the upper-outer part of the eye gave rise to backward and downward dislocation of the lens in the case reported by **Wray**, of London.

S. E.

(8) **Spicer**, of London, reports the cases of one boy and two girls belonging to the same family, aged three, five, and eleven years respectively, with

dislocation of the lenses, and in two of the three instances with displacement (ectopia) of the pupils upwards or downwards, as the case might be. The lens lay in the anterior chamber in one eye of two of the children, while in the third, owing to contradictions in the text of the communication, it is impossible to say whether one or both lenses lay in the anterior chambers. The cause of the dislocation was unknown, except in the girl of eleven years where it followed traumatism in one eye. Two of the dislocated lenses were treated by scoop extraction. SYDNEY STEPHENSON.

VIII.—OPERATIONS.

1.—The Lacrymal Apparatus.

(1) **Maynard, F. P.—A useful modification in extirpation of the lacrymal sac.** *Ophthalmic Review*, February, 1914.

(2) **Foroni, C.—A new procedure for treating dacryocystitis. (Ein neues Verfahren zur Behandlung der Dakryocystitis.)** *Zeitschrift für Augenheilkunde*, Vol. XXXII, page 226, 1914.

(3) **Clark, J. Sheldon.—The West intranasal partial resection of the tear sac for dacryocystitis, dacryostenosis, phlegmon, or epiphora.** *Ophthalmology*, April, 1915.

(4) **Cirincione, Speciale.—The bacterial flora of the conjunctiva and nose after dacryo-rhinostomy. (Sulla flora batterica congiuntivale e nasale dopo la dacrio-rinostomia.)** *La Clinica Oculistica*, May-June, 1915.

(5) **Tooker, C. W.—The operative treatment of chronic dacryocystitis.** *American Journal of Ophthalmology*, May, 1915.

(6) **Raia, V. L.—Toti's operation for dacryocystitis, with the report of twelve cases.** *Annals of Ophthalmology*, July, 1915.

(7) **Harmer, W. Douglas.—The intra-nasal treatment of dacryocystitis.** *Trans. Ophth. Society U.K.*, Vol. XXXV, 1915, p. 232.

(1) In the operation here described, **Maynard,** of Calcutta, makes an incision about an inch long and a quarter of an inch internal to the inner canthus commencing well above the palpebral ligament and passing down along the orbital margin. All structures are divided to the bone. The sac, with the periosteum, is separated on the inner side towards the nasal duct and divided as low as possible ; it is then removed from below upwards. One great advantage claimed is that it is easier to avoid cutting the sac walls, by doing which a portion of the wall may be left behind, another being that there is less likelihood of damaging the conjunctiva.

A. H. PAYAN DAWNAY.

(2) **Foroni,** as first assistant at the Genoa *clinic*, has had considerable experience of dacryocystorhinostomy. He has treated twelve cases by this method, but as four of them relapsed, he now mistrusts the operation, which, moreover, he finds very difficult to perform. The causes of relapse are :—the fact that Toti leaves the whole of the nasal duct and most of the sac

untouched. In consequence, pus continues to form in the sac, and eventually fails to pass through the artificial opening, which gets very small as the cicatrices contract. A second cause is the fact that the sac openings get displaced from the nasal aperture. This displacement is favoured by the pressure of the dressing and bandage. The last and most important cause lies in the extraordinary power of regeneration possessed by the nasal mucous membrane to close all operation openings. The three causes can be summed up by the statement that the artificial opening formed by Toti's method tends to close. Foroni tried to modify the operation and to improve it without any satisfactory result, and eventually abandoned it for a method of his own, which is carried out in the following way :—

1. The nasal mucous membrane is anæsthetised with novocain and packed in the neighbourhood of the sac.
2. The conjunctival sac is anæsthetised with cocaine.
3. The puncta are dilated with a conical probe.
4. The secretion in the sac is expressed and the sac is washed out.
5. The sac and duct are anæsthetised with novocain and adrenalin.
6. The canaliculi are both slit up with Weber's knife, which is passed in to slit up the external wall of the sac. Care is taken to avoid the caruncle.
7. The opening in the sac is enlarged and the palpebral ligament divided with scissors, with, if necessary, the help of a squint hook. The sac is now fully exposed.
8. Weber's knife is now passed into the duct until it impinges upon the floor of the nose.
9. The whole length of the duct is now freely incised in several directions, laterally, forward, backwards, etc. The duct must be drastically incised down to the bone.
10. A stout Bowman's probe is introduced and left *in situ* for some time.
11. The sound is removed and a drain introduced, which consists of a strip of gauze soaked in a solution of cyanide of mercury and well squeezed out. The drain must extend to the floor of the nose and fully distend the sac. The drain must be changed daily until no more secretion is found. The treatment generally lasts from a fortnight to a month.

This treatment is easy and effectual, and is applicable to all forms of dacryocystitis, including the phlegmonous type.

The author extirpates the sac only in special cases, and when tumours and tuberculosis are present. He does not remove the sac in cases of hypopyon-keratitis and corneal abscesses. The treatment described, combined with the author's operation of keratectomy, is always competent to cure these cases, even when pus is flowing from the canaliculi. T. HARRISON BUTLER.

(3) **Clark**, of Freeport, Illinois, is a whole-hearted advocate of the West operation. In this paper he gives a description of the operation, with a number of illustrations of the steps in the procedure, and of the instruments employed A. J. BALLANTYNE.

(4) The introduction of the operation of dacryorhinostomy has enabled us, says **Cirincione,** to make a long stride towards the solution of the problem of the prevention of ocular infection in cases of disease of the lacrymal passages. It is of importance both as a method of relieving the inflammation of the passages and as affording a communication between the conjunctival sac and the nose. It might have been thought probable that the operation, by opening the nasal sac directly into the middle meatus (a cavity rich in bacteria), might have left the conjunctiva more liable to

infection, and Cirincione has undertaken this series of investigations partly with the intention of examining this point. Further, he wished to know how long should elapse between the dacryorhinostomy and any operation on the globe, in order to give the best possible conditions.

It had made itself clear that the complete removal of the sac which had been proposed, largely with the hope of making operation possible on the globe, often failed of its aim, because there remained some slight purulent discharge from a small cystic cavity lined with epithelium which formed at the junction of the canaliculi. Further, the constant lacrymation which was a necessity after excision, kept the conjunctiva irritable, and therefore in a state more apt for the development of bacteria. Calderaro showed that the abolition of the downflow of tears, after the destruction of the passages, produced an increase of the bacterial flora. For this reason he advised a long interval between the removal of the sac and any operation on the globe.

From the researches made for the present paper, Cirincione concludes that the flora of the conjunctiva differs from that of the nose, after the operation of dacryorhinostomy, even if we examine the region nearest to the opening of the canaliculi. From this fact, and from other experimental evidence, he proves that bacteria from the nose do not pass into the conjunctival sac, even though the bacteria are motile and the lower part of the nose is plugged. He thinks that the best time for operation on the globe is a month after dacryorhinostomy. H. GRIMSDALE.

(5) A case of excision of the lacrymal sac is described by **Tooker**, of St. Louis.

(6) **Raia**, of Providence, reports twelve cases of Toti's operation from his practice. Eight were cured in three weeks, two were greatly improved after six weeks, one required a systematic treatment with a probe for eight weeks with improvement, and one was decidedly worse. The cures are claimed as permanent. A further report after longer intervals would, however, be more convincing. The use of a local anæsthetic during the operation is recommended, and the details of the method employed are given.

R. H. ELLIOT.

(7) Most cases of dacryocystitis are doubtless secondary to nasal disease, but the attempt to cure the former by treating the latter is generally unsatisfactory.

Harmer, of London, appears to have found a nasal abnormality common to all the cases of dacryocystitis he has had an opportunity of examining, namely: a flattening of the inferior turbinate, which almost obliterates the anterior part of the inferior meatus on the affected side, and which may cause a local rhinitis implicating the opening of the duct.

The author glances at the operations devised by Toti (1904), West, and Polyak (1913), and then describes his experiences with ten operations performed according to West's method. The operation is comparatively easy for those accustomed to intra-nasal work, and it can be done under local anæsthesia. In order to obtain more room, in three of the cases a sub-mucous resection of the septum was necessary as a preliminary step. Bleeding and oozing were troublesome complications. Of the ten cases, six were cured, one improved, one has not been traced, and two were not benefited. The cures have been maintained from periods that varied from three weeks to one year. Harmer concludes that intra-nasal dacryocystostomy is a good operation.

It may be added that of four cases treated by the Yankauer operation by Harmer, two were improved and two not improved.

Discussion.

Cross, of Clifton, Bristol, had examined two of the patients operated on by Harmer, and was satisfied with the results.

Paton, of London, believed that resort should be had to West's operation when the ophthalmic surgeon could not obtain good results by simpler measures. It should not be done when acute suppuration was present.

Jessop, of London, expressed his satisfaction with the result of Harmer's operations.

Wray, of London, thought cases of dacryocystitis should seldom need intra-nasal operations. It was impossible for ophthalmic surgeons to approve an operation that converted the sac into an accessory sinus of the nose. The ideal procedure was one that left the anatomy of the parts as nearly normal as possible.

Coats, of London, had seen two unsatisfactory results, possibly due to the gelatinous consistence of the contents of the much dilated sacs.

Davies, of Cardiff, had performed Toti's operation in about twenty cases, and all but three of them had been successful.

Priestley Smith, of Birmingham advocated the use of silver styles, as described in the *Ophthalmic Review* of 1911. SYDNEY STEPHENSON.

2.—Pterygium.

Cazalis, G. A.—The operative treatment of pterygium by the formation of a conjunctival hem opposite the cornea. (**Thérapeutique** opératoire du ptérygion par la création d'un ourlet conjonctival, **face à la cornée.***) *La Clinique Ophtalmologique*, 10 septembre, 1914.

To the many ways of treating pterygium **Cazalis**, of Beziers, adds one more.

The pterygium is detached pretty much in the usual way, the basal incision not being carried too far back. The bed of the growth is then most scrupulously cleared of all tags of tissue by curetting, cauterising, and then apparently scraping again with a very sharp knife, used after the manner of a plane. After this the upper conjunctival region is raised in the form of a flap by two incisions parallel with the corneal limbus. The corneal edge of this flap is then turned in so as to make a hem which shall face the cornea instead of a raw surface facing the cornea. The flap is next carried well down below the level of the still attached lower portion of the conjunctiva, and therefore well below the original attachment of the pterygium, and stitched there. According to the author, this operation is the best safeguard against the relapses which are the usual bugbear of operations for the removal of pterygium. ERNEST THOMSON.

3.—Strabismus and Muscular Imbalance.

(1) McCool, Jos. L.—The operative treatment of muscular imbalance. *Ophthalmic Record*, April, 1914.

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*[illegible]

(2) **Ewing, A. E.—Three valuable sutures in the operation for advancement.** *American Journal of Ophthalmology*, May, 1915.

(1) **M'Cool**, of Portland, Ore., gives details of his method of investigating cases of heterophoria and squint. It includes a study of the muscle balance for infinity at 13 inches distant; convergence near point and divergency power; the field of binocular single vision, and the rotation of each eye. "Stevens's tropometer is the only instrument with which this can be accomplished with any degree of accuracy." He states that, in his opinion, "no case should be subjected to operation until the rotation of the eyes has been determined. With the more thorough knowledge of the tropometer in diagnosing rotational abnormalities, and a proper interpretation of its findings and limitations, there will come a modification in our ideas of the proper surgical measures to employ in cases of muscular imbalance. By this I mean that instead of regarding many of these cases of imbalance as due to innervational faults, we shall come to recognise that quite a large percentage are attributable to structural and insertional abnormalities."

Speaking of operative methods, the author states that there is no great variety of tenotomies, as the operation is easy, but it is not so with advancements. The number of different operations that have been put forth from time to time proves that the perfect operation has not yet been devised. "They all fall short in some one particular, but to my mind success or failure does not depend so much upon the kind of operation as upon the skill and experience of the operator."

The author describes his particular methods for tenotomy, advancements, and tendon tucking, and reports three illustrative cases.

J. JAMESON EVANS.

(2) To all who have experienced the extreme difficulty of obtaining anything like uniformity of result in squint operations, the method described by **Ewing,** of St. Louis, will appeal as one more attempt to make certain of the efficacy of the sutures. Ewing employs no fewer than eight sutures, namely three *advancement* (as employed by many operators), three *fixing*, and two *supporting* sutures. The three fixing sutures are those to which the title of the article refers. The description of the operation is too complicated for abstract—indeed, one is inclined to wonder if the operation itself is not unduly tedious—but, in a general way, it may be said that the advancement sutures bring the muscle to its new insertion, the fixing sutures fix the insertion to the muscle and conjunctiva, while the supporting sutures take origin from the muscle and conjunctiva far back and are passed into the tendinous insertions of the superior and inferior oblique muscles, "sufficiently far from the corneal margin as to not involve the cornea after tying them."

The painstaking complication of this operation is a practical comment on the claims made for operations aiming at simplicity of execution combined with certainty of result. The author's own description of the method, which is, of course, illustrated by diagram, will be studied with interest by those who have found the satisfactory operative cure of squint one of the most difficult problems of ophthalmic surgery. ERNEST THOMSON.

IX.—REMEDIES.

(1) **Stengele, Udo**.—On the use of optochin in different external eye diseases. *American Journal of Ophthalmology*, August, 1915, from *Klin. Monatsbl. f. Augenheilkunde*, Vol. LIV, page 446.

(2) **Bradburne, Arthur Alison.**—Massage in glaucoma. *Medical Press and Circular*, December 8th, 1915.

(1) **Stengele**, of Bremen, has had much success with optochin in serpent ulcer of the cornea and in phlyctenular disease. A number of cases are reported at length. So far as we understand the writer, he uses a 1 per cent. solution repeatedly instilled in ulcer cases, and a 5 per cent. solution, preceded by the instillation of cocaine, in phlyctenular disease. Perhaps the most interesting point which is made is the importance of optochin in cases where there is disease of the lacrymal sac, along with purulent corneal ulcer. If the sac be removed first, then the several days bandaging prevents continuous treatment of the cornea. If, on the other hand, the sac operation be postponed, the cornea does not get a fair chance. The writer found that by syringing the lacrymal sac with optochin solution, its infectivity was so far reduced as to enable the corneal ulcer to heal over, after which the sac could be excised. He makes no claim to cure the lacrymal disease with optochin, because, owing to the ectasia of the sac, a fresh infection takes place sooner or later. It is worth noting that optochin fails or acts very slowly in those cases of phlyctenular disease where there is accompanying eczema of the lids, and especially where there is a fissure at the outer canthus. The eczematous condition must first be cured. Stengele does not consider that the good effect of optochin on photophobia in phlyctenular disease is due to its anæsthetic action, which latter is short, but to its bactericidal power. "With what kind of bacteria, beside the pneumococci, this result is reached, the future will have to tell." It is also to be remembered that the drug loses power with keeping, until at longer than four weeks, the solution has almost entirely ceased to have any activity.

ERNEST THOMSON.

(2) The keynote of this article by **Bradburne,** of Manchester, is given by the following quotation : "no case of chronic glaucoma should be operated on until the case has been carefully watched and treated during a period of treatment by massage as well as with modified course of miotics." Bradburne sees another advantage in the practice of auto-massage, namely, that a patient acquires so good a knowledge of intra-ocular pressure that he is able to keep the surgeon acquainted with the progress of the condition. The action of massage in myopia is glanced at.

SYDNEY STEPHENSON.

BOOK NOTICE.

The American Encyclopedia and Dictionary of Ophthalmology. Edited by Casey A. Wood, M.D., C.M., D.C.L., assisted by a large staff of collaborators. Volume V.—Conjunctivitis Phlyctenulosa Pustulosa to Dioptrics. Chicago: Cleveland Press, 1914.

The fifth volume of the *American Encyclopedia of Ophthalmology* differs from some of its predecessors in that it contains no individual article of very great length. Nor, somehow, does it seem to be any the worse for this accidental circumstance. Indeed, it is, possibly, the most generally interesting of all the volumes to date. For one thing, it happens to be rich in biography, containing the names of Credé, Daviel, Dalton, and Desmarres, to mention only a few. The somewhat lengthy note on Daviel's life and activities is particularly of value and interest, because it contains excerpts from the master's work "*Sur une Nouvelle Méthode de Guérir la Cataracte par l'Extraction du Crystallin*," which will repay perusal by those who take an interest in the history of the treatment of cataract.

In this notice the reviewer does not propose to follow the plan adopted in dealing with some previous volumes, that, namely, of picking out a few important articles for study. Instead, he has "skimmed" the whole volume with a view to mentioning a certain number of points which have occurred to him in the process. One such point is the richness in biography just referred to.

In the earlier pages the articles on the "Conjunctiva" are continued. That these are up-to-date may be surmised from the inclusion of squirrel-plague conjunctivitis—a full description. Yet the original paper on which the article is based was only read on September 10th, 1914, and 1914 is the date on the title page of this volume.

Frank Allport's eighty page article—one of the longest—on "Conservation of Vision" is somewhat heterogeneous in contents, the latter including such widely different menaces to ocular health as ophthalmia neonatorum and defective illumination.

"Cataract" seems to be as difficult to keep out of the various parts of the Encyclopedia as King Charles I. out of the Memorial. It keeps cropping up in all sorts of places and here we have it appearing again under the heading "Coppock"; and quite a good account of "Coppock" cataract it is.

The reviewer confesses that he had never before heard of the "Corespace." He has received but slight enlightenment even now. The article concerning it is a kind of headless body, since it seems to have been snipped (very possibly by the late C. A. Oliver himself) from Norris and Oliver's *System of Diseases of the Eye* without sufficient of the antecedent context to make it intelligible. One may ask, by the way, why this work is so frequently referred to—in various connections—simply as *System of Diseases of the Eye* without the authors' names. Surely there are, or might be, other "Systems" than that of Norris and Oliver?

The "Cornea" occupies a good deal of space, but it is broken up by many headings, and these are further cross-referred to keratitis, injuries, and so on. Corneal Ulcer is of course an important article. Tattooing and Transplantation of the cornea are discussed. One would almost expect operative procedures to be referred to the letter O, but this course has not been generally followed. Magitot's work on corneal transplantation receives recognition.

In the biographical notice of Credé, the following sentence is noteworthy: "For Credé did more, much more, than merely to bring back sight to the blind" (the rôle of the ophthalmologist) "To a large extent he succeeded in banishing the unspeakable monster of blindness from the very face of the earth. Would that all indifferent or ignorant physicians could be brought to recognise the immense importance of his method."

A number of headings under "Cyclitis" do not contain the whole story, being cross-referred to other articles. It is rather surprising to find eight pages devoted to "Cyclodialysis," and one is tempted to speculate as to the number which will be required for "Glaucoma."

A considerable amount of space is required to deal with the various Cysts occurring in and about the eye. One of the most notable and complete articles is that on "Cysticercus Cellulosæ": it includes the life-history as well as the ocular relations of the parasite.

One may commend the article on "Cylindrical Transposition" as a test for sobriety. We are all accustomed to transpositions in ordinary practice, and it must be confessed that at times, when the brain is tired, they do not come quite easily. Like the words "British Constitution" some of the problems here given, and the accompanying rules, are not easy to circumnavigate without a clear head.

More serious criticism may be applied to the definition of Day-Blindness and Day-Sight. The subject of the respective meanings of hemeralopia and nyctalopia is a debateable one, which has been rediscussed recently in the *British Medical Journal.* There seems no particular reason for saying on page 3777 that hemeralopia is the proper term to apply to functional day-blindness, and then, on the next page, defining day-sight as hemeralopia, without any further qualification whatever.

Dacryocystorhinostomy receives full attention, not only as to Toti's operation (1909) and its modifications, but also in respect to operations, prior to that of Toti.

Under "Decompression" occur ten pages of observations additional to what has been said in previous volumes under "Brain Tumour" and "Choked Disc."

An article on "Dental Amblyopia" deals in up-to-date fashion with oculo-dental relationships, while under the caption—to employ a favourite American term—"Dentists, Asthenopia among," Casey Wood quotes from his highly practical lecture to dentists in 1906.

Another association—"Dermal and Eye Lesions"—is discussed by Burton Chance. "Within recent years," says this writer, "there have been reported with increasing frequency, disease of the ocular structures associated with or directly connected with, distinct disease of the skin." Perhaps the most striking of these unusual associations is that of choroidal disease with acne.

Gradle's account of "Development of the Eye" is masterly. The reviewer can think of no other article which deals in such easy language with this subject, or in which the illustrations are so genuinely explanatory.

"Diaphanoscopy" is well described and illustrated.

The volume ends with an article on "Dioptrics," by H. S. Gradle.

ERNEST THOMSON.

NOTES AND ECHOES.

Deaths.

HERMANN SCHMIDT-RIMPLER died on September 23rd, 1915, aged 77 years. He was a pupil of A. v. Graefe, and, both in his private work (1862-63) and in the Berlin Charité (1868) acted as assistant to the Master. In 1871 Schmidt (for the suffix Rimpler, was not assumed until after his marriage) was appointed extraordinary professor of ophthalmology in Marburg, where two years later, he became ordinary professor. In 1885 he was enabled to open the new clinic, built largely owing to his own efforts, with forty-four beds. In 1880 he was nominated rector of the University of Marburg. Schmidt-Rimpler accomplished most of his scientific work during the twenty years he spent in Marburg. His well-known and popular text-book, which went through seven editions, and was translated into several foreign languages, was published during that period of activity. In 1890 Schmidt-Rimpler accepted a call to Göttingen, and in the following year to Halle a. S., where he eventually died. He retired from active work in 1910, when he had reached the age of seventy-two years.

Adolf Weber, whose death has been already mentioned in THE OPHTHALMOSCOPE, died on July 17th, 1915, at Darmstadt, in his eighty-sixth year. Like H. Schmidt-Rimpler, he had been a pupil of A. v. Graefe (1854). His name will not be readily forgotten by ophthalmic surgeons, inasmuch as, about the same time as Max Knies, he recognised the important part played in the pathology of glaucoma by closure of the angle of the anterior chamber. Knies supposed that the peripheral adhesion of the iris was due to inflammation, but Weber proved, by the pathological examination of a recent case, that the main factor was mechanical, and brought about by the pushing forward of the root of the iris by the œdematous ciliary processes.

The deaths are also announced of Walter von Forster, assistant in the Göttingen Royal Eye Klinik, who was killed on October 28th, by a grenade wound in the neck, and of Julius Kramer, assistant in the Berlin University Eye Klinik, who fell in the battle of Luneville.

* * * *

Appointments.

MR. P. G. DOYNE, son of Mr. R. W. Doyne, has been appointed ophthalmic registrar at St. Thomas's Hospital, London.

The secretary of the Royal Westminster Ophthalmic Hospital, London, Mr. J. H. Johnson, has accepted an organising appointment from the War Office in the Army Service Corps, with rank of lieutenant.

* * * *

Ophthalmic Surgery by Nurses!

EITHER a cock-and-bull story has been foisted by some practical joker on a youthful reporter, or else things are not as they should be at "a London hospital." The story in itself contains such elements of improbability that we prefer to accept the former of these alternatives. It is stated, with the utmost gravity, by the *Daily Chronicle* that a "professional man who had found it impossible to get an oculist to attend to his eye called at a hospital, hoping that in return for a donation to the funds one of the doctors would be able to attend to him," It is, of course, quite inconceivable that in London anyone seeking an ophthalmic surgeon for a non-urgent complaint should have the slightest difficulty in finding one, and the action taken was equally plainly, a gross attempt at abuse of a voluntary hospital. The story proceeds to the effect that preferential treatment before a crowd of waiting out-patients was refused, but a "sister" volunteered to perform the requisite operation. The "professional man" consented; "the eye was flooded with cocaine by the competent sister, and in the gentlest and most skilful way she removed a troublesome cyst." Furthermore, the credulous reporter is informed, it is not at all uncommon "for the matron or senior nurses to undertake these minor operations." We devoutly trust that this preposterous story has no foundation, and that there is no hospital in London or elsewhere in which the diagnosis and operative treatment of diseases of the eye or any other part are entrusted to unqualified persons, whether they be matrons, nurses, or lift-boys; and we shall require more than assertions in the lay press to induce us to believe that this is the case.—*The Hospital.*

* * * *

Midland Ophthalmological Society.

THIS small but energetic society, founded in 1911, has issued its programme for 1916, during the course of the first six months of which three meetings will be held. Two of these will take place at the Birmingham and Midland Eye Hospital, and the third at The Eye Hospital, Cheltenham.

The new executive includes Mr. N. C. Ridley as president, Mr. E. W. Wood White as treasurer, and Mr. J. Jameson Evans and Mr. T. Harrison Butler as secretaries. We note with approbation that the publication of original papers read before the Society shall be left in the hands of authors.

* * * *

The Price of Drugs.

IT is indeed fortunate that the ophthalmic surgeon as a rule prescribes and uses but small quantities of the more important remedies employed in his work. For atropine is now 4d. a grain, and physostigmine and homatropine cost 9d. and 1s. 2d. a grain respectively. Cocaine is quoted at 2d. a grain. Aspirin, a popular remedy with ophthalmologists, is now twenty times dearer than it was at the outbreak of war. Phenacetin, another popular remedy, is now costing twenty-two times its price as charged before the war.

* * * *

Oxford Ophthalmological Congress.

THE Oxford Congress will be held this year on July 13th and 14th. The discussion, to be opened by Sir Anderson Critchett and Sir William Osler, will be on "The relationship of Ophthalmology to General Medicine."

THE OPHTHALMOSCOPE DIARY.

	1916.	
Midland Ophthalmological Society.	February 1st.	Midland Eye Hospital, Birmingham.
Royal Society of Medicine: Section on Ophthalmology	Feb. 2nd	1, Wimpole Street, W.
Midland Ophthalmological Society.	April 4th	Midland Eye Hospital, Birmingham.
Ophthalmological Society of the United Kingdom.	May 4th, 5th & 6th	London.
American Ophthalmological Society.	May 9th & 10th	Washington, D.C.
Midland Ophthalmological Society.	June 6th	Eye Hospital, Cheltenham.
Royal Society of Medicine: Section on Ophthalmology	June 14th	1, Wimpole Street W.
Oxford Ophthalmological Congress.	July 13th & 14th	Keble College, Oxford.

THE
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A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

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ORIGINAL COMMUNICATIONS

SOME ASPECTS OF OPHTHALMOLOGY IN PALESTINE.*

BY

T. HARRISON BUTLER, M.D.(Oxon.).

LATE ASSISTANT SURGEON TO THE BRITISH OPHTHALMIC HOSPITAL, JERUSALEM.
BIRMINGHAM, ENGLAND.

DR. RICHARD MIDDLEMORE founded this annual post-graduate lecture to further the diffusion of a knowledge of ophthalmology among medical men practising in the Midlands. It forms a link between the ophthalmic surgeon and the rest of our profession, and should deal with questions which, although not deeply technical, are yet not fully treated in the ordinary text books.

As one lecture follows another, the choice of a suitable subject becomes increasingly difficult. This year it is more than usually so: the War has brought us to a resting stage, so to speak; a stage, however, which will not, I hope, be less fruitful than the period of scientific activity which has just closed. In some respects our speciality has become an exact science, but there are many problems which have not yet been solved. I may mention among them the causes and treatment of glaucoma, the value of the intracapsular method of extracting cataract, the ætiology of iritis, the cause of myopia, and the exact position to be accorded to tuberculin treatment. We are in possession of an array of valuable facts, and can command extensive statistics, but up to the present we are not able to come to any definite conclusions.

Our thoughts have been directed to the Near East by the progress of the great War, and it has occurred to me that it would be useful to lay before you some of the features of ophthalmic work in Palestine, and to point out in what directions knowledge gained in that country may help us to solve some of the difficulties which we meet with at home. I feel sure that the study of eye diseases as they appear under conditions of environment, climate, and race, widely different from those obtaining in Northern Europe, may in some respects be of great service to us, and that we may become possessed of valuable facts which we could not easily obtain in this country. Affections of the eye which are comparatively rare in England are frequently seen in Palestine, and a condition which is generally trivial in Birmingham may be formidable in Jerusalem. Again, some operations which we perform here only occasionally form part of the daily routine in an Eastern clinic, and in consequence we are able to perfect the *technique* of these procedures in such an institution as the British Ophthalmic Hospital in Jerusalem, to the great advantage of our patients in this hospital. I need hardly remind you that operations for trichiasis are comparatively uncommon even in such a large institution as the Birmingham Eye Hospital; in fact, I see that in 1913 only one was performed, whereas in Jerusalem they exceed 5,000 a year. The same may be said of operations for pterygium and for the formation of an artificial pupil. It is obvious that the experience gained in these three operations must be of extreme value to us at home. Just as Indian experience has enriched our *technique* as regards operations for cataract and glaucoma, so we must look to the Near East for the best methods of treating diseases of the lids and cornea, and perhaps for the solution of the riddle of trachoma.

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* Middlemore Post-Graduate Lecture, December, 1915.

In the time at my disposal it is impossible to deal with the whole of ophthalmology, so I shall confine myself mainly to the important question of acute ophthalmia, the scourge of the East, dealing only in a general way with the remainder of the vast subject.

My experience in the East was gained during the four years that I acted as assistant surgeon to the British Ophthalmic Hospital in Jerusalem.

This institution was founded by the English branch of the Order of the Knights of St. John in 1882. The work rapidly increased, largely owing to the great reputation of W. E. Cant, F.R.C.S , as a successful operator. For 23 years he acted as chief surgeon to the hospital, and its enormous success forms the highest tribute to his sterling abilities in ophthalmic surgery.

Mr. D. C. Lloyd Owen, who has been intimately associated with the Middlemore Lecture from its inception, has for the past few years acted as consulting surgeon to the British Ophthalmic Hospital, and is now vice-chairman of the Hospital Committee. This close connection between our local school of ophthalmology and the Jerusalem Hospital is an additional reason why I should give you some account of its activities.

In 1910 over 40,000 attendances were noted, and about 10,000 new patients registered. In 1913 more than 2,500 operations were performed. It is interesting to compare these figures with the statistics of the Birmingham Eye Hospital. Here the attendances number 80,000—just double the Jerusalem number; but the operations only total 750– less than one-third the Jerusalem figures! The staff at the British Ophthalmic Hospital consisted of two qualified men, two unqualified male native assistants, one or two English nurses, and a native untrained nurse. There were 40 beds, and they were fully occupied. In spite of the small staff, we always kept a note of each out-patient, and each in-patient had a full case history. Our patients were drawn from a large variety of races, which included Jews—both European and Eastern, Arabs, Bedwân, Turks, Circassians, Greeks, Armenians, Indians, Copts, Syrians, Russians, and Germans. Over fifty languages may be heard in Jerusalem, but our work was carried on in Arabic, Yiddish, and Spanish. For clinical purposes, it is sufficient to divide the patients into two classes—Europeans and European Jews, and Eastern races. The first class, consisting chiefly of Jews from Germany, Poland, and Russia, often made many attendances; in fact, the Jews raised the average number of attendances per patient to four, which is greater than the Birmingham average, which is a little over two. Practically, every class of case seen in England is represented in the East, but the incidence and severity of disease are entirely different. The chief distinguishing feature of the work in Palestine is the large number and importance of affections of the lids, conjunctiva, and cornea. Diseases of the uvea and cases we class together as "fundus cases" were rarely seen. Glaucoma and cataract were not more common than they are at home. We did very little refraction work at the British Ophthalmic Hospital. Errors of refraction are not common among the Eastern races, but they occur among the European Jews to the same extent as they do among the Jews we see in England.

It is interesting to note that high myopia with every degree of fundus change, including detachment, is to be found among the Arabs and Bedwân. I have analysed the books I have by me, which include 21,600 cases. Among them I find 20 examples of high myopia with fundus changes. Probably not one of these patients could read, and most of them were Fellaheen and Bedwân, who had never done any close work at all. This fact effectually disposes of the theory that high myopia is caused by near work.

The rarety of uveal disease is significant. In 21,600 cases I have discovered only 13 cases of iridocyclitis. We were not troubled with iridocyclitis after cataract extraction, although almost all the eyes were in a septic trachomatous condition. Pyorrhœa aveolaris is exceedingly common in Palestine, and is often very severe. It is quite the rule to find bleeding scorbutic gums and horrible oral sepsis, and yet iritis and cyclitis are rare diseases. This fact affords no confirmation of the theory that oral sepsis is a common cause of iritis. On the other hand, gonorrhœa and syphilis are so uncommon in Palestine that they may be almost neglected as ætiological factors in disease. Syphilis is occasionally seen among the Jews and in Fellaheen, living near the Egyptian border, but practically never among the Bedwân. The absence of venereal disease explains the rarity of iritis. I have investigated the ætiology of 100 cases of iritis seen at Coventry, England, and was able to trace a syphilitic origin only in 25. This leaves 75 per cent. to be otherwise accounted for. Palestine statistics seem to show that a venereal ætiology is the cause of far more than 25 per cent., which suggests that gonorrhœa is responsible for a large proportion of the cases seen in Europe. The more carefully one investigates the ætiology at home, the more convincing is the evidence of the leading *rôle* in its causation played by gonorrhœa.

The absence of the venereal factor explains the rarity of primary optic atrophy. In 21,600 cases I can only find five examples. Uhthoff states that primary progressive grey optic atrophy is always a symptom of tabes, general paralysis, or cerebral syphilis; in other words, it is invariably a syphilitic disease.

Our experience of glaucoma in the East affords us no help in solving the questions in dispute as regards its ætiology and treatment. I find among 21,600 cases, 26 of absolute glaucoma, 18 of chronic glaucoma, 2 of acute glaucoma, and 1 of buphthalmos. Glaucoma is, therefore, not more common in Palestine than with us. The majority of the patients came up for treatment only when the disease had progressed so far that treatment was hopeless. A large percentage of the cases were absolute, with deeply cupped atrophic discs. The tendency was rather in the direction of rapid atrophy than of high tension. Acute and subacute glaucoma were infrequently seen. The results of iridectomy were not promising, and often seemed actually to hasten the progress of the disease in glaucoma simplex. A certain number of trephine operations have been performed, but they must be exceedingly dangerous. Late infection seems to be a serious objection to sclerectomy in civilised lands; in Palestine, where infective disease of the conjunctiva is the rule rather than the exception, the risk of late infection must be enormous.

Cataract in all its forms exists in Palestine much as it does with us. In 1913 out of 2,542 operations, 192 were upon the lens; in the same year, at the Birmingham Eye Hospital, out of 755 operations 239 were upon the lens. Excluding casualties, the proportion is 1 in 52 new patients for the British Ophthalmic Hospital; 1 in 62 for the Birmingham Eye Hospital. It is obvious, then, that cataract is not more frequent in Palestine than in Europe. It is interesting to note that R. H. Elliot states that cataract is not disproportionately common in India, the apparent frequency being due to the enormous population and the small number of ophthalmic hospitals. Practically all our operations were performed by the combined method. There was no object in accepting the increased risk of the simple method, and preliminary iridectomy was out of the question.

The immediate results were certainly better than those obtained in England. I performed 64 extractions of senile cataract, my first operations. Fifty-one were normal operations; 11 lost vitreous, but only 2 of them did badly. There was one example of panophthalmitis, and one of sympathetic ophthalmitis. I have no record of a single case of post-operative iridocyclitis. The figures give a percentage of 93 satisfactory results. The loss of vitreous is largely due to the fact that many of our patients had little or no self-control; in fact, in two cases the lens was spontaneously delivered in its capsule as soon as I had made the section. My English statistics compare unfavourably with these figures, although I have now had much more experience in cataract extraction, and operate upon clean eyes under the most favourable conditions. In Jerusalem the majority of the patients suffered from trachoma. My experience shows that trachoma has no influence whatever in increasing the risk of infection. In the East, if we only operated upon clean eyes, we should do very few operations! It is interesting to compare these results with those of my first 118 English cases. Thirteen eyes were lost, giving a percentage of 88 against 93 in Jerusalem. The causes of loss were as follows: iridocyclitis, 9 cases; panophthalmitis, 1 case; loss of vitreous, 1 case; recurrent syphilitic interstitial keratitis and uveitis, 1 case; recurrent hæmorrhage, 1 case. Four of the successful cases were eventual failures, on account of fundus disease, and three more were ultimately lost—one from late iridocyclitis and two from glaucoma. The final result is that only 82 per cent. were permanently useful eyes; 51 per cent. had V=6/12 or better. It is quite impossible to compare these final results with the Jerusalem figures, for we only ordered a spherical correction, and many of the patients were never seen after the first fortnight. It is, however, fairly accurate to give the Eastern successes as 93 per cent., the Western as 88 per cent. It will be noted that I lost vitreous 11 times in 64 extractions in Jerusalem, and only 7 times out of 118 operations in England. This gives a percentage of 17 for the East and 6 for the West. Loss of vitreous was practically three times as common among Orientals, a fact completely explained by the far greater docility of the English patient.

Fundus changes seem to have been very uncommon in Jerusalem, especially those due to an exudative type of disease. I find only five cases of optic atrophy in 21,600 cases. There were three of retinitis pigmentosa and one of retinitis pigmentosa albescens.

It has been stated that malaria is responsible for a certain number of eye diseases. Palestine is a highly malarious country. In fact, the patients coming from most districts, including Jerusalem, have practically all suffered from malaria, often in a pernicious form. Yet I only remember one patient whose eye condition could be ascribed to malaria. This was a case in which both retinæ were covered with punctate hæmorrhages.

Before proceeding to the consideration of diseases of the lids, conjunctiva, and cornea I may quote freely from a letter which I have received from W. E. Cant, who, as I have already stated, was surgeon-in-charge of the British Ophthalmic Hospital for 23 years, and whose experience of the subject is probably unrivalled by that of any other living man. Dr. Cant writes as follows:—

"Although I have not the hospital statistics to refer to, I can write of my impressions and recollections with some confidence.

"Iritis was extremely rare. I do not think one would come across more than a case or two in the year. Of course, syphilis appeared also to be rare in our part of Palestine. There were a lot of cases of very high myopia, as there were of very high hypermetropia. My impression is that they were among the Jews.

"Phlyctenular conjunctivitis was very common, the cases were especially frequent at the time the purulent ophthalmia began to appear, or preceding it. I always considered that it was due to a germ infection. It occurred amongst the healthiest people, and the yellow oxide, with the help of atropine, never failed quickly to settle it.

"The ophthalmoscope cases, as you remember, formed a very small proportion of the cases, and I cannot recollect much about inflammatory or exudative conditions of the retina. Optic atrophy cases we had, but they are not very numerous.

"Acute glaucoma was rare, but we had a fair number of chronic and absolute glaucomas. I did not like having to operate in chronic glaucoma, as now and then a disastrous result occurred, but of course suitable cases had to be undertaken. Some of the results were quite satisfactory, but there was seldom the opportunity of tracing the patients afterwards. Cataracts did well; *there was practically no fear of iritis or iridocyclitis* When an eye was lost it was from acute suppuration. I think these cases amounted to about 2 per cent. of the operations."

W. E. Cant suggests that most of the cases of high myopia were among the Jews, but my own case books show that quite a considerable number were Arabs, who lived in the open air and never did any close work whatever.

Diseases of the lids, conjunctiva, and cornea are the characteristic features of ophthalmology in the East. They are seen in numbers and virulence unheard of in Europe.

The inhabitants of Egypt and Palestine suffer from ophthalmia to an extent that can hardly be realised unless one has lived in the East So much, indeed, is this the case that in Palestine probably not 10 per cent. of the population have absolutely sound eyes. In the years 1903 and 1904 over 2,000 cases of leucoma adherens, staphyloma corneæ, and shrunken eyes came to the British Ophthalmic Hospital, forming 15 per cent. of the total new cases for the years in question. Most of the damaged eyes are the result of the annual summer epidemic of acute muco-purulent conjunctivitis, a small minority only are caused by trachoma and other diseases.

These two diseases—trachoma and acute muco-purulent conjunctivitis—have generally been somewhat vaguely classed together as "ophthalmia." Microscopic examination and consideration of the clinical facts will show that this view is erroneous. The majority of the cases of acute muco-purulent conjunctivitis recover completely, leaving the lids as they were before the attack, normal lids remaining normal, trachomatous lids trachomatous. Indeed, in a few cases, pannus may be improved by an attack of the acute disease.

The large majority of cases of trachoma commence very insidiously, and for a long time cause no symptoms. They have never had any acute stage.

These facts, taken with the evidence which the microscope affords, show conclusively that trachoma and acute muco-purulent conjunctivitis have nothing in common, but are distinct diseases.

Acute muco-purulent conjunctivitis may nevertheless become very chronic, lasting for months, and may give rise to a permanent thickening of the lids, with the formation of cicatrices. These cases may resemble trachoma, and probably true trachoma is often grafted upon them. In such conditions the infection has generally been gonococcal, and the eyes have been neglected or injudiciously cauterised with strong solutions of silver nitrate. It is convenient to use the term "ophthalmia" as synonymous with muco-purulent or acute catarrhal conjunctivitis.

Ophthalmia is always endemic in Palestine, and in the summer and autumn it assumes the form of a severe epidemic. We can for convenience sake speak of the endemic period and the epidemic period.

Bacteriology of Ophthalmia.

While I was in Palestine, I systematically, for a whole year, examined smears taken from all types of ophthalmia. About 200 eyes were investigated, some of them repeatedly. I found that the organisms present were those associated with ophthalmia in Europe: the Koch-Weeks' bacillus, the diplobacillus of Morax and Axenfeld, the pneumococcus, and the gonococcus. These organisms were often found in mixed infections.

In a certain number of cases, some of them very acute and complicated with corneal ulcers, no organisms could be detected in the smears, even after repeated examination. I have classed these as sterile, although doubtless in at least some of them a culture would have shown the presence of organisms. Unfortunately, we had no means of making cultures at the Hospital while I was there.

The following table shows the comparative frequency of the organisms during the endemic period, which extends from January to July :—

Simple Ophthalmia: Endemic Period.

	Per cent.
Morax-Axenfeld diplobacillus	18·3
Koch-Weeks' bacillus	18·3
Pneumococcus	18·3
Mixed infection	16·7
Gonococcus	8·4
Sterile	20

The mixed infections contained the Morax-Axenfeld diplobacillus in every instance, generally associated with the pneumococcus or a few Koch-Weeks' bacilli. Two cases showed the Morax-Axenfeld with the gonococcus.

The net result is that during the winter endemic period, the majority of ophthalmias were caused by the Morax-Axenfeld bacillus. The pneumococcus and Koch-Weeks' bacillus were almost as common. The gonocccus was rare.

These figures do not refer to cases showing corneal ulcers, so we find that in the endemic period the gonococcus causes a simple, often mild, ophthalmia. In the summer epidemic the opposite is the case. Infections with the gonococcus nearly always cause corneal ulcers, which generally perforate.

I will now exhibit a table of the bacteriological statistics taken from very chronic ophthalmias.

Very Chronic Ophthalmia: Endemic Period.

	Per cent.
Mixed infections (which all contained Morax)	35
Morax-Axenfeld diplobacillus	25
Gonococcus	15
Pneumococcus	5
Staphylococcus	5
Koch-Weeks' bacillus	0
Sterile	15

The five gonococcal cases were all acute cases which had become chronic. I have found this organism after three months of careful treatment.

The percentages during the summer epidemic are very different, as may be seen from the following table :—

Acute Ophthalmia: Epidemic Period.

	Per cent.
Koch-Weeks' bacillus	66
Pneumococcus	22
Mixed infections	5
Morax-Axenfeld diplobacillus	4
Gonococcus	0
Sterile	2

It is obvious that the summer epidemic is chiefly caused by the Koch-Weeks' bacillus. Its percentage has risen from 18·3 in the endemic period to 66 in the epidemic period. The pneumococcus is also an active agent, whereas the diplobacillus plays no great part in the epidemic. The gonococcus does not appear at all in the table, because in the epidemic period it is so virulent that it practically always attacks the cornea.

Twenty cases of severe ulcers were examined, of which 13 had perforated or the whole cornea had sloughed. The following table shows the organisms present :—

	Per cent.
Gonococcus	40
Mixed infections	25
Pneumococcus	15
Koch-Weeks' bacillus	10
Morax-Axenfeld diplobacillus	5
Sterile	5

Twenty-three slight ulcers yielded the following results :—

Mixed infections	30·4
Pneumococcus	26·1
Koch-Weeks' bacillus	21·8
Gonococcus	8·7
Morax-Axenfeld diplobacillus	4·3
Sterile	8·7

These results would seem to show that, excluding the gonococcus, a mixed infection is more likely to attack the cornea than a simple infection.

Some cases of acute and inflamed trachoma were examined. The results appear in the following table :—

Acute Trachoma.

	Per cent.
Sterile	60
Mixed infections (all containing Morax)	30
Pneumococcus	10

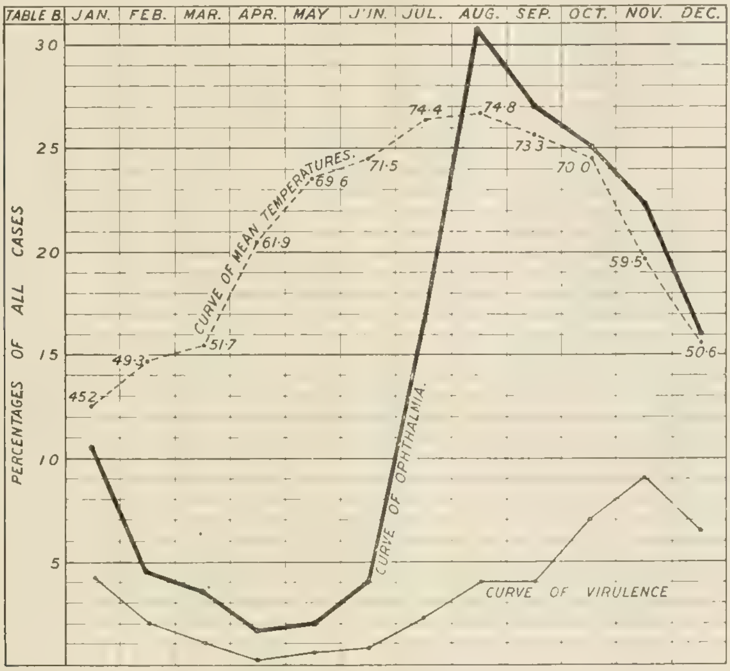
The examination showed that trachoma was very liable to become infected with the Morax-Axenfeld bacillus, but that more than half of the cases were sterile.

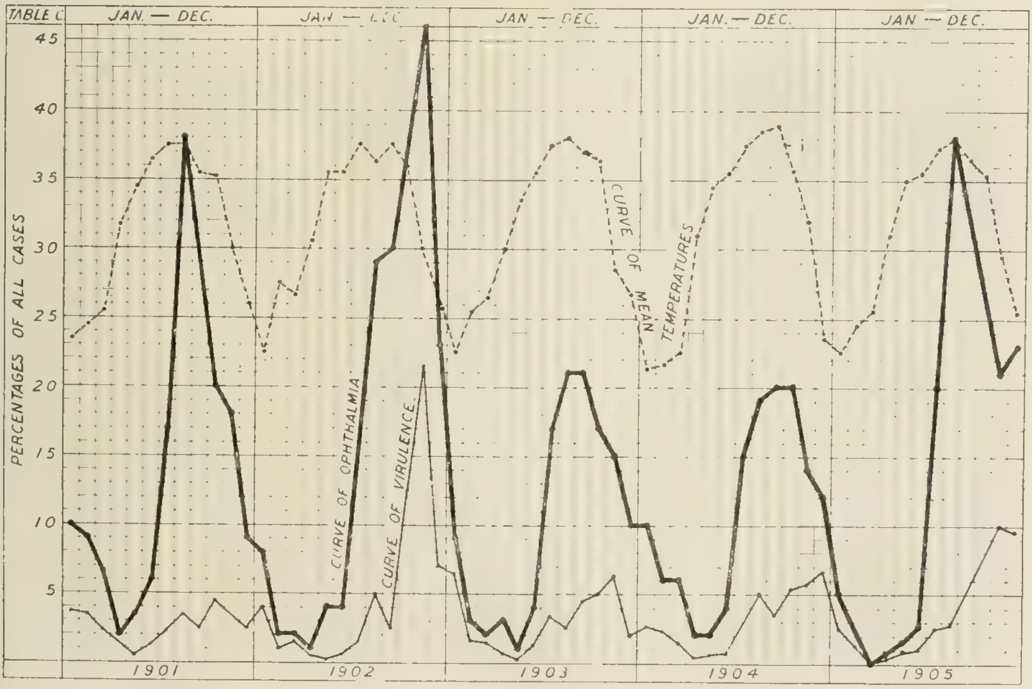
A full account of these researches will be found in a paper I published in 1907 : "The Clinical Features, Bacteriology, and Treatment of Acute Ophthalmia in the East," *Roy. Lond. Ophthalmic Hospital Reports*, Vol. XVII, Part I.

Ætiology of Ophthalmia.

The epidemic of ophthalmia commences annually in July. The proportion of cases increases rapidly till August, when, as regards numbers, the epidemic is at its height. In November and December the cases are fewer in number, but they are of a far graver type. A large proportion now become complicated by corneal ulcers, which frequently perforate.

In January the epidemic decreases rapidly, and in March, April, and May there are very few cases, and these slight ones. A large number of cases of catarrhal conjunctivitis begin to appear in June, and herald the approach of the epidemic. These monthly variations are exhibited graphically in Tables B and C.



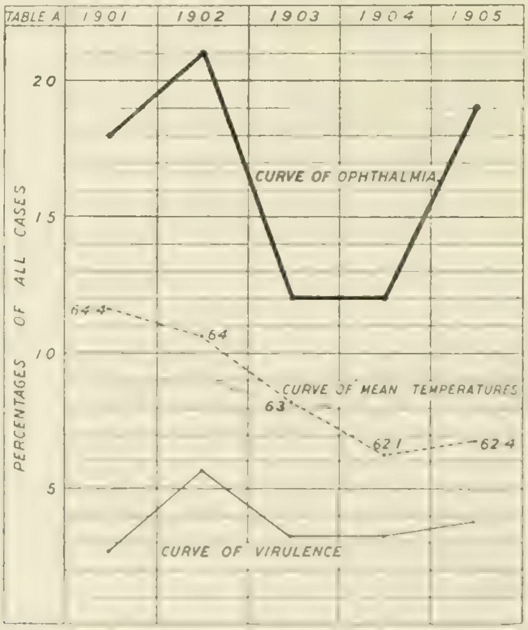


To obtain the degrees of temperature in table C, double the percentage figures in the first column.

The upper curve shows the relation between all new cases and all ophthalmia cases expressed in percentages. The lower curve, the curve of *virulence*, shows the relation between the total new cases and the cases of corneal ulcer, perforation, hypopyon, iritis, onyx, and other severe complications. These tables indicate plainly that the disease increases in virulence as the epidemic progresses. This is especially noticeable in the curve for the year 1905, in Table C.

In compiling these tables the statistics for the years 1900-05 were used. During this period 34,028 new patients came to the British Ophthalmic Hospital, and 5,701 were suffering from ophthalmia, forming 16·7 per cent. of the whole. We have already stated that another 15 per cent. of the total cases suffered from leucomata and other sequelæ of ophthalmia, so that really 30 per cent. of all the patients who attend a clinic in the Near East suffer from ophthalmia and its results. The figures show the extraordinary prevalence and the immense clinical importance of the disease. Trachoma is not included in these statistics.

The annual epidemics vary very much in severity. This is graphically represented in Table A, which shows that 1903 and 1904 were mild years ; 1902 and 1905 moderately severe.



The five years under consideration had only mild epidemics. Sometimes, however, the disease becomes a veritable scourge, and almost every third native one meets with in the street is a sufferer.

It is very difficult to trace the cause of the epidemic. The micro-organisms implicated are never lost sight of during the year, they are all endemic ; but why do the Koch-Weeks' bacillus, the pneumococcus, and the gonococcus manifest a sudden exaltation of virulence in July, whereas the virulence of the Morax-Axenfeld diplobacillus is not increased ?

I have plotted the mean temperature for the five years upon the charts as a dotted line.

It will be seen that there is a partial, but by no means absolute, correspondence between the ophthalmia and the mean temperature curves.

A reference to Table A shows that in 1901 and 1902 the mean temperatures were 64·4°F., and 64°F., and were associated with a severe epidemic. In 1903 and 1904, years with mild epidemics, the mean temperatures were only 63°F. and 62·1°F. But in 1902 there was a severe epidemic, but the mean temperature was only 62·4. In Tables B and C it is shown that the monthly fall of temperature is followed exactly by a fall in the ophthalmia cases, but the curve of mean temperature rises for four months before the curve of ophthalmia follows it.

Nor does the amount of rainfall or humidity afford any explanation. In Palestine no rain falls from the end of March till November. From November to March 31st there are about sixty wet days, and some 30 inches of rainfall. The rainfall has a great effect upon the number of patients, but none whatever upon the *proportion* of ophthalmia, nor upon the virulence of the disease.

At present no reason whatever can be given for the large amount of ophthalmia in Palestine. All the conditions of the Near East—the dust, the dirt, the heat, the flies, and the general lack of sanitation—are to be found elsewhere unaccompanied by either trachoma or ophthalmia.

The presence of the gonococcus in many of these cases is another anomaly, for practically none of the sufferers from gonococcal ophthalmia have gonorrhœa. Ophthalmia neonatorum seems to be unknown in Palestine; I never saw a case, and W. E. Cant told me that he had no recollection of one. As I have already stated, venereal disease is very rare in Palestine. I am compelled therefore to conclude that the gonococcus exists endemically in the eyes alone, and is passed from eye to eye without the intervention of the urethra. I have never seen gonorrhœal metastases in the joints, the heart, or the iris. Meyerhoff, of Cairo, has independently arrived at the same conclusion with regard to gonococcal ophthalmia in Egypt.

Means of Spread.

The first sufferers in the epidemic are generally children, often babies one or two years old, and, spreading from the children, the epidemic becomes general.

The Jews in Jerusalem live in small houses, often mere huts made of the square tins in which paraffin is sold. There is considerable overcrowding, much dirt, and no sanitation. In spite of the great heat of the summer, the windows and doors are kept shut; water is scarce, and washing an infrequent luxury. A mother uses her apron to wipe the eyes of her children, or if there be a handkerchief, it is common property. Under such conditions it is manifest that ophthalmia will easily spread from one individual to another.

The Fellaheen, the Arab peasants, lead an entirely outdoor life in the summer, but the whole family shares the common mattress, and so infection spreads from eye to eye. Flies are, in my opinion, important agents in the dissemination of ophthalmia. The East abounds with these pests. Every patient has his own particular swarm, and flies seem to show a special preference for the eye. One often sees a child with several flies settled in and around its eyes, and the Fellaheen mothers are far too apathetic to brush them away.

(*To be concluded.*)

THE ÆTIOLOGY OF GLAUCOMA.

(*Continued.*)

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CLOSURE OF THE FILTRATION ANGLE.

No discussion of the part which the filtration angle plays in the causation of glaucoma would be complete without the mention of four classic names:—those of Leber, who, in 1873, first demonstrated the function of this angle as the filtration area of the eye; of Kneis and Weber, who, working independently on the clue thus afforded them, discovered simultaneously the frequency with which the angle of the anterior chamber was obstructed in glaucomatous eyes (A.D. 1876); and of Priestley Smith, whose careful, painstaking, and accurate life-work has made to science a contribution of nearly everything worthy of credence that is to-day comprised in our knowledge of the pathology of glaucoma. So true is this statement that the writer feels the impossibility of fully acknowledging his indebtedness to Priestley Smith in the work which appears in the following pages. There is no branch of the subject that has not been illumined by his researches. The work that he did in his early years has never yet been seriously challenged, and it commands to-day, as it rightly should, the practically unqualified acceptance of all those who are best fitted to give an opinion on the subject. His views may be summarised as follows:—

(1) Closure of the filtration angle is, in all early cases, caused by the base of the iris being pressed against the periphery of the cornea. At first, the closure thus brought about is simply mechanical. The surfaces are in apposition, and the free escape of aqueous is thus impeded, but no more; for the fluid from the aqueous chamber can readily make its way along the meshes of the loose iris stroma, and can thus find a free passage through the open mouths of the crypts of the iris into the loose structure of the cribriform ligament, and thence into Schlemm's canal. Such is the condition with which we have to deal in the very early stages of a case of congestive glaucoma, and up to quite a late stage in simple glaucoma.

(2) The apposed surfaces of iris-base and corneal periphery become adherent to each other as the result of a plastic exudation thrown out between the two membranes. This occurs very early in acute cases, more slowly in the sub-acute, and only after a considerable lapse of time in the simple glaucomas. In all alike, however, it is merely a question of time, for closure of the filtration angle occurs sooner or later in nearly all, if not in all, unrelieved primary glaucomas. As might have been expected, the firmness of the adhesions formed varies greatly in different cases. In the simple attacks, not merely do they appear late, but they are so easily broken down that the manipulation of the eye, necessary for microscopic examination, is often sufficient to detach the iris base from the cornea, and thus to give a false impression of openness of the angle, which belies the true condition that existed *in vivo*. In any case, the adhesions first formed may be very peripheral and may not extend

round the entire circumference of the eye. As time goes on, the belt of adhesion widens and becomes firmer and firmer, whilst the whole periphery of the anterior chamber eventually becomes involved.

(3) A further stage is believed to have been reached when the **iris tissue** is not merely in contact with and sealed to the periphery of the cornea, but is also **firmly compressed** against it in such a way as to occlude the spaces which normally allow the free passage of fluid through the iris stroma. For our knowledge of this condition, we are indebted to Fuchs,[2] who first described it in connection with glaucoma, secondary to leucoma adherens. He pointed out, that so long as the iris tissue remains normal in structure, which it may do even after it has become adherent to the cornea, the fluid from the anterior chamber can find its way freely along the loose meshwork of its stroma, and thus pass from it, into and through the ligamentum pectinatum. This is the more easily possible, since "in many places, corresponding to the peripheral crypts, the anterior layer of the iris is absent, and the aqueous humour, contained within the iris is therefore in immediate contact with the ligament." In the cases Fuchs studied, the determining factor of the onset of glaucoma was the state of the iris, which "looked normal or even a little distended in cases with normal tension, whilst it was compressed and atrophied in cases with excess of pressure." He considered "the atrophic change to be the effect—not the cause—of the hypertonia." Priestley Smith has applied Fuchs' observations to cases of ordinary glaucoma; and he would appear to be perfectly correct in doing so. The third stage, then, would be that of compression of the adherent iris. Such compression would have a double effect:—(1) It would impede the normal excretion of fluid, by opposing a barrier to its passage through the iris stroma, on its way to the pectinate ligament and so to the canal of Schlemm; and (2) it would interfere with the vascular circulation throughout the tissue of the iris, and thus pave the way for the next stage of the process, *viz.* atrophy of the iris.

(4) **Atrophy of the iris tissue.** This late stage, like every other of the process we have been describing, is reached much earlier in the acute and sub-acute forms of glaucoma than in the simple chronic form. It is merely an expression, as has already been suggested, of interference with the normal circulation through the part.

(5) The final stage is a **drawing back of the iris when the ciliary processes retract**; this process may be so extreme as to lead to the iris being greatly stretched or even torn through.

REFERENCES

1. **Smith, Priestley.** Glaucoma, 1891, J. & A. Churchill; Glaucoma Problems, *Ophth. Rev.*, 1911 and 1912.
2. **Fuchs.**—The Ophthalmoscope, Vol. VI, 1908, pp. 742—746.

The question, which next presents itself to our notice, is the very important one:—

HOW IS THE CLOSURE OF THE FILTRATION ANGLE BROUGHT ABOUT.

The answer varies with the form of glaucoma we are discussing. We will therefore take each in turn.

(*a*) In Congestive Glaucoma, the ciliary processes are enlarged, owing to the increased supply of blood to the parts, and their apices extend further forward than usual. They thus come anteriorly into contact with the iris, and sometimes with the lens margin internally, and so may acquire a wedge-like shape from compression between these two structures. Moreover, the processes become thickened transversely, with the result that the spaces between them are narrowed, or obliterated. This explains the pushing forward of the iris base which occurs so early in congestive cases, and which is accompanied by a corresponding shallowing of the anterior chamber. But this is not all. The position will be more easily appreciated if we put it thus:—(*a*) the congestion of the ciliary processes leads to their turgescence; (*b*) the result is a displacement forwards and inwards of their apices; (*c*) this carries the iris directly forwards, and so tends to jam its base against the periphery of the cornea; and (*d*) it, at the same time, causes an advancement of the lens in its zonule, which, in its turn draws the ciliary processes forwards. A vicious circle is thus established. At the same time, the changes which will be discussed in the next section are operative also in the cases we have been discussing, but are thrown into the shade by the manifestations of the congestive process.

(*b*) In simple glaucoma, the displacement forwards of the iris is a result of the enlargement and advance of the lens, which take place as life progresses. In the early stages, these changes involve no serious compression of the iris; fluid can still gain access to the pectinate ligament through the open iris crypts, even when the iris and cornea are in actual contact peripherally. Later on, as the tension increases, the area of iris contact grows wider, the channels in the iris stroma gradually become compressed and closed, and the applied surfaces become adherent to each other. These adhesions may, however, be so slight that they readily separate during the preparation of the eye for examination. In the final stages of simple chronic glaucoma, congestive attacks, sometimes very mild in character, may supervene, due to the increased compression to which the iris is subjected.

In all cases of glaucoma alike, the relative size of the eye is an important factor; this will be dealt with later under its appropriate section. Nor must vascular, secretory, and degenerative conditions be left out of count, but these, too, will find a mention each in its proper place. For the present, we are concerned with the pathological condition of the angle of the chamber, and the questions which arise therefrom.

To summarise in the briefest possible manner what has gone before, we may say:—(1) all forms of glaucoma (with certain rare exceptions which will be discussed later) are eventually brought about by a closure of the filtration angle: (2) that closure is due (a) in congestive cases to a swelling of the ciliary processes, and (b) in simple cases to an alteration in the size and position of the lens. What is the evidence for and against such a proposition?

THE IMPORTANCE OF THE RÔLE PLAYED BY CLOSURE OF THE FILTRATION ANGLE.

(1) Closure of the filtration angle occurs at some stage in nearly all, if not in all, cases of primary glaucoma, provided the condition remains unrelieved.

(2) It appears (clinically) to be an early feature of the acute and sub-acute forms of congestive glaucoma; in these, it becomes permanent if left alone; but if relieved, the angle re-opens, and the glaucoma passes away.

(3) The common antecedents of an acute attack of glaucoma, *i.e.*, nervous and vascular disturbances, as well as the consequences of the ill-advised use

of mydriatics, find a ready explanation on the theory of closure of the angle, but not otherwise.

(4) Closure of the angle is "the one common feature in the morbid anatomy of secondary glaucoma" (Parsons).

(5) In simple glaucoma, a peripheral adhesion is almost always present in the final stage of the complaint, and appears to arise, as in acute glaucoma, by a pushing forward of the iris base by the ciliary processes.

(6) A closure of the angle, as the result of very slightly raising the vitreous pressure above that in the anterior chamber, can be demonstrated in the dead eye; it at once stops all passage of fluid through the eye, and is associated with a shallowing of the anterior chamber.

(7) A marked shallowing of the anterior chamber is a feature common, sooner or later, to both the simple and the congestive types of glaucoma.

(8) In all forms of glaucoma, a small size of the eye is found to be a prevalent feature. The influence of this on closure of the angle will be discussed shortly in the appropriate section.

(9) Slight contact between the iris base and the cornea will account for doubtful, slight, and varying rises of tension at an early stage, in chronic cases whilst a slowly increasing compression of the iris base will explain (a) the gradual rise in tension often met with, (b) the slow formation of a peripheral and widening band of iris adhesion, and (c) the ultimate access of pain and congestion.

(10) The fundamental process at work seems to be the same in all cases of glaucoma, although the rate of progress of the rise in pressure and the part borne by vascular disturbances, vary very greatly in different eyes.

CRITICISM OF THE FOREGOING EVIDENCE.

The evidence we have just adduced, in favour of the supposition that a closure of the filtration angle is the cause of glaucoma, is not beyond criticism.

(1) It may be suggested that **the actual anatomical evidence is scanty,** and that we have relied largely on clinical data in order to form a conception of the pathological conditions which our train of reasoning would lead us to believe to be present. This is partly true, and the explanation is fairly obvious, for (i) we seldom if ever get material for investigation at an early stage of glaucoma; (ii) it is difficult, if not impossible, to obtain a view of the iris base and of the ciliary processes in the living eye; and (iii) when the globe is removed for examination, the relationship of the parts is greatly altered: (a) by reason of the loss of blood, which necessarily takes place, (b) by changes in the pressure within the globe on its removal, (c) by changes occurring under hardening reagents, or under freezing and thawing, and (d) by further changes which take place when the hemisphere is divided into yet smaller parts before cutting.

(2) In addition to all this, **one worker may criticise another's methods** of preparation of specimens, and by showing that his *technique* is faulty, may suggest that his deductions are unreliable. T. Henderson[1] has taken this line with reference to Priestley Smith's work, and has endeavoured to prove that there have been two sources of fallacy therein, *viz.*:—(1) A possible want of strict meridionality in the sections made, and (2) an absence of sufficient serial sectioning to justify a correct reconstruction of the parts. Priestley Smith[2] has effectively answered these objections, detailing his method of preparing specimens in doing so. The most important point is that some of the eyes have been examined after an equatorial section, which

permits the ciliary region to be studied by the naked eye from behind, and so avoids the source of fallacy to which Henderson objects. Moreover, Priestley Smith has improved his methods, taking advantage of the recent advances in *technique*, and after reconsidering the whole question, has been strongly fortified in the opinions he originally formed as to the cause of glaucoma.

(3) It has from time to time been **suggested that the closure of the filtration angle is a consequence and not a cause of glaucoma.**—A review of the arguments in favour of the closure of the angle being causative of the rise in intra-ocular pressure has been put forward above, and each surgeon must draw his own conclusions. To the writer's mind, the evidence, although circumstantial, is overwhelming. He feels, however, that no words of his can carry such conviction as the following sentences, recently penned by Priestley Smith.—" Having, during the last two years, gone over much of the old ground again, with the help of fresh material and better methods, including photography, I am myself more firmly convinced than ever of the importance of the closed filtration angle and of its dependence in primary glaucoma on changes in the shape and position of the ciliary processes and lens."

(4) It has been pointed out, that **a closed angle is sometimes found in eyes which have never been hard**, and the inference has been drawn that under the circumstances it would be wrong to conclude, that closure of the angle leads to a rise in ocular tension. The suggestion is that it is merely an accidental coincidence. The reply to this is : (i.) that in some of these eyes an artificial exit for the escape of fluid exists ; *ex. gr.*, the presence of (a) a minute fistula, or (b) what has been termed a "pseudo-cornea," in which the new tissue, stripped of endothelium, is no longer impervious to fluid ; (ii.) that in others the secretion of the ciliary body has been arrested by disease, and (iii.) that, in still others, the iris, although in contact with the pectinate ligament, and adherent to it, has never been compressed, and consequently has not really interfered with the access of the aqueous to Schlemm's canal.

(5) On the other hand, **an open angle has been demonstrated anatomically in eyes blinded by glaucoma.** The inference, at first sight, would appear to be that in these cases at least obstruction of the angle cannot be the cause of the glaucoma. Priestley Smith's reply to such a contention is : (i.) that in some of these cases an albuminous fluid, unfit for filtration, has replaced the normal aqueous, and (ii.) that in others, a closure of the angle, which existed during life, has been broken down in the course of the preparation of the specimen. In 54 eyes which he examined, he found only 5 with an open angle ; of these 3 showed a displacement of pigment, which strongly suggested that the separated surfaces of iris and cornea found in the laboratory, were really in contact in the living eye ; the remaining 2 were probably cases of secondary glaucoma.

REFERENCES.

1. **Henderson, T.**—"Glaucoma." London : Edward Arnold, 1910.
2. Smith, Priestley. *Ophthalmic Review*, May, 1912.

SHALLOWING OF THE ANTERIOR CHAMBER OF THE EYE.

A shallowing of the anterior chamber of the eye is an anatomical feature which is met with, sooner or later, in the vast majority of cases of glaucoma. The subject has frequently been referred to in the preceding pages, and it has been pointed out that the phenomenon we are now discussing occurs very early in acute and in sub-acute congestive glaucoma, and at a much later period, but still with great constancy, in the simple form of the affection.

It is very closely associated with the closure of the angle of the chamber. The pressure on the iris base, which leads to the latter, must obviously have the effect of diminishing the depth of the chamber. The shallowness so produced favours a wider adhesion between the iris base and the periphery of the cornea. We here meet with yet another instance of the establishment of a vicious circle in the evolution of the disease. It is sometimes pointed out that cases are seen in every clinic, in which the anterior chamber is not perceptibly shallowed, in eyes which are the seat of unquestionable glaucoma. The reply to this is, (1) that in some of these cases the fault lies in the altered constitution of the aqueous fluid, which renders filtration slow and difficult, and (2), that it is not always easy to decide whether the angle of the chamber is interfered with or not. It does not necessarily follow that a chamber, which is shallow centrally, has its angle obliterated, or that a chamber which has a fair depth centrally, has a free angle. The use of modern methods will, however, sometimes help us to decide these points. This matter has been dealt with elsewhere[1] by the writer, and need not detain us now.

Priestley Smith has most generously placed at the writer's disposal the following summary of his present views on the shallowing of the anterior chamber. These views have undergone some slight change, and have not yet appeared elsewhere in their present form. It is felt that it would be a work of supererogation either to comment on the statement, or to attempt to add to it, and it is therefore published exactly as it has been received, with merely a cordial acknowledgment of the kindness which prompted him in sending it :

" In primary glaucoma the anterior chamber is usually shallow. In the main this is a pre-existing and pre-disposing condition,—a cause rather than a consequence,—as proved by the fact that persons suffering as yet in one eye only usually have a shallow chamber in both. It is a physiological condition proper to the life-period in which primary glaucoma commonly arises. The explanation lies, in part at least, in the continuous growth of the lens. That the chamber is shallower in some eyes than in others at the same time of life may be explained by the fact that lenses belonging to the same life-period, differ considerably not only in total bulk but in the ratio of their axial and transverse diameters : some are relatively thick but small transversely, others thin and wide.[2]

" Another possible cause for the senile shallowing of the chamber, and for individual differences, is this :—The lens is held in position chiefly by the innumerable cords which pass at various angles from its peripheral zone to the ciliary processes, and—as experiments have shown—when the processes advance the lens advances with them. Now the processes alter in size and shape with the advance of life ; they are more prominent and bulky in the old than in the young ; moreover individual eyes belonging to the same life-period present great differences in this respect[3]

" It is likely that these changes in the processes involve change in the position of the lens.

" But the physiological shallowing of the chamber is only half the question. In acute congestive glaucoma the chamber becomes shallower *during the attack*. The iris no doubt is partly responsible : it becomes thicker as the pupil dilates ; it may thicken still more through venous hyperæmia ; its periphery is carried forward by the swollen processes. But this is not all. The chamber becomes shallower in the area of the pupil : the lens moves forward. Why is this ? High pressure in the chambers does not explain it unless we assume an excess of vitreous over aqueous pressure.

"We know that a slight excess of this kind suffices to displace the lens and processes, to close the filtration-angle, and therewith to arrest escape of fluid from the eye.[4] A likely cause for such excess in acute glaucoma is found in the condition of the circumlental space. In elderly people the space between lens and processes is narrowed by the increased volume of the lens; it is further narrowed, sometimes in marked degree, by the increased bulk of the processes. The grooves between the processes become narrower for the same reason (Hess); during an acute glaucoma the processes are turgid with blood and have been found jammed against each other laterally and against the lens. Under these conditions it is likely that vitreous fluid is unable to enter the aqueous chamber—that it is imprisoned behind the lens and drives it forward.

"This explanation, suggested by the writer many years ago, is, however, not the only possible explanation. When the ciliary processes in the rabbit) are rendered turgid by ligaturing the vortex veins, their apices advance and the lens advances with them.[5] The same result has been obtained by cauterising the limbus of the eye externally, and when only one-half of the circle was cauterised the swelling of the processes was limited to this half, and the lens was tilted forward *at this side only*.[6] These observations, the latter especially, suggest that when the processes become turgid and advance, the lens is carried forward by reason of its attachment to them.

"In any case they show that extreme swelling of the processes even in a healthy eye (rabbit's eye) shallows the chamber, closes the filtration-angle, compresses the base of the iris, and arrests the escape of fluid from the chambers, so as to produce an exaggerated picture of acute glaucoma."

REFERENCES.

1. **Elliot, R. H.** *Ophthalm. Review*, Vol. XXXIV, 1915, pp. 204 and 205.
2. **Smith, Priestley.** *Ophthalmic Review*, February, 1911, p. 34.
3. **Hess, C.**—*Archiv f. Augenheilk.*, Vol. LXVII, p. 341, 1910, and abstract in *Ophthalmic Review*, January, 1913.
4. **Smith, Priestley.**—*Ophthalmic Review*, December 1910, p. 354.
5. **Koster, W.**—von Graefe's *Archiv f. Ophthalmologie*, 1895, Vol. XLI, part ii, p. 30.
6. **Groenholm.**—Abstract in Nagel's *Jahresbericht* for 1901, p. 552.

THE DIMENSION OF EYES IN GLAUCOMATOUS PATIENTS.

According to Priestley Smith:—

(1) The eyes of women are, on the average, a little smaller than those of men; this is in correspondence with the relative size of the bodies in the two sexes.

(2) The eyes of glaucomatous persons are, on the average, a little smaller than those of the non-glaucomatous. He found the average horizontal diameter to be 11.17 mm. in the glaucomatous, and 11·6 mm. in the non-glaucomatous.

(3) The last statement is equally true of the acute and of the chronic forms of the disease.

(4) Smallness of the eye is not an ever-present factor in primary glaucoma, but it is a determining factor in a considerable number of cases, and must be taken into account in any complete explanation of the disease.

(5) It is due to defective growth, and not to senile shrinkage of the eye.

(6) There is no hard and fast line between eyes which are a little below the normal in size, and those which can be unhesitatingly classed as microphthalmic. All intermediate forms can be traced, without difficulty. The percentage of very small corneas is much greater in the glaucomatous than in those with healthy eyes.

(7) The decisive factor in determining the onset of glaucoma, is not the absolute size of the eye, but its size relative to that of the lens it contains. The subject must therefore be again considered when dealing with the next section.

THE CONTINUOUS GROWTH OF THE LENS THROUGHOUT LIFE.

Thomson[1] has found that "in the full time fœtus, the cornea amounts to about one-fifth of the circumference of the globe on section ; its transverse diameter measures about 10·6 mm. in the specimens examined, so that there is comparatively little increase in its growth requisite to reach the adult proportions. It follows then that the increase in the size of the globe after birth is mainly due to an expansion of the scleral part of the eyeball and its contents." Again, according to Priestley Smith, the cornea increases little, if at all, in its diameters after the age of five, and possibly diminishes slightly after forty. The sclera is probably fully grown somewhat before the rest of the body. It is obvious that since these two structures determine the size of the eye, the growth of the globe ceases even before that of the body generally. The lens, on the contrary, continues to increase in size up to an advanced period of life ; nor need this difference between it and the rest of the globe cause us any surprise, since it is ectodermal in origin, whilst they arise from the mesoderm.

"The salient fact is that while the lens grows larger as life advances, the globe does not, so that the older the eye becomes, the more likely it is to suffer from the disproportion in question, and the smaller it is the earlier in life is the disproportion likely to arise" (Priestley Smith[2]). Now an enlargement, or an advance of the lens, tends to push the iris base into contact with the periphery of the cornea, a tendency which will obviously be exaggerated in eyes with a restricted corneal periphery. The consequences would be easy to foretell, *viz.*, (1) at any early stage, a mechanical closure of the angle of the chamber, leading to an obstruction to the free flow of fluid towards the canal of Schlemm, and (2) at a later period, a compression of the iris tissue, resulting in a still more serious interference with the excretory currents of the eye.

It is probable that the changes we have just been discussing are operative in the causation of all attacks of glaucoma, but it is in the chronic non-congestive forms that the rôle of changes in the size or position of the lens bulks the largest. In the congestive attacks they are overshadowed by the evidences of the vascular storm, whilst in the simple cases they are not thus obscured.

REFERENCES.

1. **Thomson, Arthur.**—"The Anatomy of the Human Eye ;" *Clarendon Press*, p. 9.
2. **Smith, Priestley.**—*Ophthalmic Review*, Vol. XXXI, p. 202.

(*To be continued.*)

ON THE USE OF METHYLENE BLUE IN EYE-WORK.

BY

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METHYLENE BLUE has been known and used as an intestinal antiseptic for many years, and the employment of it in diseases of the conjunctiva and cornea is not new. It has been recommended by Dunbar Roy and Melville Black, amongst others, for corneal ulcers and mucopurulent conjunctivitis, but I had personally never tried it until Professor Dreyer, Professor of Pathology in Oxford University, suggested its use to me in infective conditions of the eye.

In the *Journal of Pathology*, Vol. XV, No. 1, July, 1910, Professor Dreyer and Dr. Ainley Walker published a paper on the antiseptic properties of varying dyes, in which they came to the following amongst other conclusions:—

1. The same series of dyes gives opposite results on different bacteria and results showing very different intensities of action; and the same chemical modification in a dye, works in opposite directions on different bacteria.
2. The lethal action seems to be most marked in the dye which shows the greatest affinity for the bacterium concerned.

In the rush of out-patient work, it is not possible to make an accurate bacteriological examination in every case; smears and even cultivations frequently give a negative result. But in the cases in which I used the methylene blue, I always found the causal organism first, so as to be able to form some opinion in which cases, if any, the drug would be of use. I have now employed it in a very large number of cases caused by various micro-organisms.

In the strength of a 1 in 1,000 solution in normal saline, it can be used quite freely, the smarting caused being only trifling. Occasionally, I have used a 1 in 500 solution, but this causes considerable smarting, and has no apparent advantage.

For local application, after first cocaining the eye, a 3 per cent. solution (not filtered) on a cotton wool swab has been used; but lately I have had a stick made up with orthoform and holocaine, to use instead of this, for rubbing on the lids. The results obtained may be roughly summarised as follows:—

In acute conjunctival conditions, pseudo-membranous conjunctivitis, and chronic conjunctivitis, especially those due to the staphylococcus aureus, the methylene blue lotion, used in the strength of the one in a thousand solution, proved distinctly superior to solutions of argyrol, sulphate of zinc, or mercury perchloride, or other antiseptic lotion.

In those cases of conjunctivitis in which free discharge persists in spite of the frequent use of argyrol or other organic silver compounds, the eyes have often cleared up very rapidly when treated by the methylene blue lotion.

For pneumococcal conjunctivitis the effect was good; but for hypopyon-ulcer, due to pneumococcus, neither the lotion nor touching the ulcer itself with the strong 3 per cent. solution was sufficiently effective.

In acute and recent cases of trachoma, the 3 per cent. solution, or the stick rubbed into the conjunctiva of the everted lids had a really excellent effect, and I have now adopted it as the routine treatment. All secondary infection, discharge, and photophobia rapidly ceased, and it appeared to have a beneficial, although slow effect on the disease itself.

For stopping the purulent discharge in cases of obstructed naso-lacrymal duct, it is again of great value, and also in the cleansing up of a discharging socket.

In diplobacillary conjunctivitis the effect was very slight, and far inferior to zinc sulphate lotion.

For gonorrhœal ophthalmia in adults, and ophthalmia neonatorum due to the gonococcus, I found it to be of no value as compared with argyrol.

In conclusion, I may say that I have found methylene blue an extremely useful alternative to the organic silver preparations, especially in cases of acute trachoma and acute conjunctivitis, especially when due to staphylococcus aureus. I have never observed any ill-effects from its use, nor any tendency to staining, even when used for prolonged periods together.

The following are a few of the cases that have been treated with the drug :—

Some cases treated with Methylene Blue.
(Unfavourable Results.)

A 19138. *Ophthalmia Neonatorum*—both eyes. (Gonococci) Right eye on solution argyrol 25 per cent., two hourly.
Left eye on lotion, methylene blue one in a thousand, two hourly.
Three days later right eye only very slight discharge and next day almost well.
Left eye still had thick discharge.
Both put on argyrol, and three days later both practically well.

A 17138. *Diplo-bacillary conjunctivitis* both eyes, worse in left eye.
Left eye put on zinc sulphate lotion four times a day.
Right eye put on methylene blue four times a day.
Two days later left eye much better, right eye as before.
Four days later left eye distinctly best of the two.
Both put on zinc and rapidly got well.

A 18682. *Serpiginous ulcer* with obstructed duct (Pneumococci). Put on lotion methylene blue, one in a thousand, and the ulcer rubbed with 2 per cent. methylene blue. The eye cleaned up a little, but ulcer spread and had to be cauterised.

A. 18142. Ditto.

Some cases treated with Methylene Blue.
(Favourable Results.)

(1) A 19096. Obstructed duct with purulent discharge (Pneumococci).
Put on methylene blue lotion one in a thousand, t.d.s.
Discharge cleaned up and became watery only.

(2) A 19296. Ditto.

(3) A 19058. Obstructed duct with secondary acute conjunctivitis.
Put on methylene blue lotion one in a thousand, t.d.s.
At end of a fortnight discharge almost stopped.
At end of three weeks practically well.

(4) A 16642. Obstructed duct with purulent regurgitation (Pneumococci).
Treated by probing and syringing with zinc sulphate lotion ; but much discharge.
Put on methylene blue lotion t.d.s. and discharge became watery only, in a fortnight's time.

(5) A 17787. Acute conjunctivitis with enlargement of the preauricular gland (Pneumococci).
Treated with zinc and boric lotion with no improvement.
Put on methylene blue lotion one in a thousand, t.d.s.
Eye became quieter in three days, and much better in five days. Swelling preauricular gland subsided.

A 18433. Acute conjunctivitis both eyes, came bad at same time.
Right eye put on solution argyrol 25 per cent., t.d.s.
Left eye put on lotion methylene blue one in a thousand, t.d.s.
One week later left eye distinctly better of the two.
Two weeks later left eye well. Right eye better.

A 18252.	Pneumococcl conjunctivitis, lotion methylene blue. This case got well quicker than A 18253.
A 18253.	Pneumococcl conjunctivitis, lotion boric acid with zinc sulphate. Both cases came bad at same time.
A 19782.	Acute conjunctivitis both eyes (Koch-Weeks). Right eye solution argyrol. Left eye lotion methylene blue one in a thousand. Fortnight later left eye the better of the two.
A 18650.	Pseudo-membranous conjunctivitis both eyes. Staphylococci. Methylene blue lotion to right eye. Solution Argyrol 25 per cent. to left eye. Right eye improved most rapidly—ten days later both eyes put on methylene blue and case well in a fortnight.
Private case.	Acute conjunctivitis associated with an acute iritis in a specific subject. Argyrol, persevered with for a month, had no effect on the discharge; but this rapidly ceased with methylene blue, one in a thousand, t.d.s.

Three soldiers with sockets discharging freely, rapidly cleaned up when put on methylene blue lotion, argyrol having no effect.

Many cases of trachoma treated with rubbing of the lids with 2 per cent. and 3 per cent. solution on cotton wool on rod, rapidly cleaned up.

Addendum.

Two cases of conjunctivitis and ulcers of cornea with acne of the face improved and recovered when put on methylene blue lotion one in a thousand.

Wishing to have an idea of the strength of methylene blue compared with other antiseptics, I applied to Dr. Ainley Walker, University Lecturer in Pathology, and he very kindly supplied the following information :—

" Taking 0·1 per cent. solutions of *each* antiseptic, we have from Kriegler's results—

for B. Pyocyaneus: Methylene blue is about half as strong as perchloride of mercury, and 100,000 times as strong as carbolic acid in disinfecting action ;

for B. Typhoid: Methylene blue is over 10,000 times as strong as carbolic acid against bac. typhocus ;

for Staphylococcus: Methylene blue is 1/6,000 as strong as perchloride and about three times as strong as carbolic acid ;

for B. Coli: Methylene blue and carbolic acid (always 0·1 per cent. solutions of each) about equally active, with some advantage probably for the methylene blue.

As you see, the activity varies enormously with the bacillus."

ACIDOSIS AND ŒDEMA IN ITS RELATION TO GLAUCOMA.

BY

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EVERY one in the profession and very many outside it have heard of acidosis. It has been pressed in as the cause of many diseases. Two years ago I was presented with a copy of a book on "Œdema" by Dr. Martin H. Fischer, Professor of Pathology, Oaklands School of Medicine, California, along with the apparatus and detailed instructions how to determine the acidity of urine and with the request to determine its acidity in all cases of glaucoma under my care. Dr. Fischer's book was read with great interest and care. It includes a large amount of carefully done experimental work on dead tissues and on living animals. It also deals with the œdema of special organs, and is, I have little doubt, the basis of many of the theories on acidosis. While it is a most interesting and suggestive book, it is not convincing from a clinical point of view. We all know how disappointing laboratory results often are when we proceed to apply them clinically.

The conclusions to be arrived at from reading this book are that many œdemas, including glaucoma as an œdema, are caused by acidosis.

How are we clinically to determine what is acidosis? The only means we have is to ascertain the normal acidity of the urine, and what is to be considered pathological variations from that normality.

To determine acidity, the solutions used are phenolphthalein solution as the indicator and decinormal sodium hydrate solution as the neutralizer. The former solution, when added in a drop or two to the acid solution to be determined, turns permanently red when the sodium hydrate solution is added to beyond the neutral point. It is a very delicate test, and a very simple one to apply. A glass tube is used having 5 cc. marked on the bottom above which it is marked in centimetres and again in tenths of centimetres. The urine to be examined is added up to the 5 cc. mark, one or two drops of phenolphthalein solution is next added, and to this is added decinormal sodium hydrate solution, shaking the tube until its contents change colour permanently. Every c.mm. of the sodium hydrate solution added being treated as one degree of acidity. Any one desirous can calculate out the acidity in terms of hydrochloric acid. I asked my friend what was regarded as normal acidity in America. He said thirty was the accepted physiological normal. I asked him how this normal was ascertained. He did not know. I was not satisfied with this normal. Major Black, I.M.S., chemical examiner to the Punjab Government, kindly prepared the phenolphthalein and decinormal sodium hydrate solution for me. I thus made sure that the solutions were correct. I got from a cantonment station 600 specimens of urine from British soldiers and 600 specimens from Indian soldiers. These were the first specimens of urine passed in the morning. These troops were in perfect health, on full ordinary military duty, and, roughly speaking, between the ages of twenty and thirty. British troops are meat eaters; the Indian troops are, for practical purposes, vegetarians. Captain L. G. Gibson, R.A.M.C., and Dr. Mehta kindly assisted me in getting through this work with the requisite quickness. This work was done in the month of November, when the temperature and climatic conditions are somewhat the same as a dry month of June in England, so that the amount of perspiration and of urine passed would be about the same as in England in June. The state of concentration or dilution of urine will thus be understood. The average acidity in the case of Indian troops was slightly higher—about one degree—than that of British troops, so that I mix up the figures for the following statistical table :—

1,200 SPECIMENS OF URINE EXAMINED.

No. of specimens.	Percentages of specimens.	Acidity in c.mm. or degrees.
10	0·83	110
50	4·16	100
60	5·00	90
100	8·35	80
170	14·16	70
150	12·50	60
180	15·00	50
180	15·00	40
170	14·16	30
100	8·33	20
30	2·50	10

From these figures, which I think are ample, it seems to me that an average determined thereon is worthless. There is such a wide range in health that we could not say of a given case within these limits that a particular condition is due to a relatively acid condition of the circulating medium, taking the urine as an indicator of that condition. I have examined the urine of many patients suffering from glaucoma, and the acidity would come well within the limits of health as indicated by the above figures, so that we could arrive at no conclusion as to the connection of acidosis with glaucoma.

Dr. Fischer's book, however, as the title implies, treats of œdema which may be caused by conditions other than acidosis, although a great deal of importance is attached to acidosis.

Dr. Fischer is, as far as I am aware, the first man to advance the view that glaucoma is primarily an œdema, a mechanical factor on which other theories of glaucoma seem to be based being secondary to this œdema. I think that the mechanical theories are exceedingly far from convincing as regards the causation of glaucoma, and I am disposed to regard Dr. Fischer's view as much more rational. The œdema of the vitreous, although it may not have acidosis as its cause, may be caused by a poison circulating in its nutrient medium. What that poison is is another question. Those who hold that we would be better without a colon, might say that it was a poison generated in the colon. Glaucoma cases, in my experience, are far from being necessarily subjects of chronic troubles of the colon. But we do know that there are definite local œdemas caused by definite poisons circulating in the blood.

To restate the view which I regard as much the most rational yet advanced: that glaucoma is due to an autogenous toxine which has a special selective affinity for the vitreous, thus causing an œdema of that body. This œdema presses forward the lens, zonula, and iris, and presses on the ciliary body, thereby bringing into action the mechanical factors on which so much stress has hitherto been laid as the cause of glaucoma.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—LUMBAR PUNCTURE IN AFFECTIONS OF THE EYE.

Ayer, James B.—**Lumbar puncture and examination of the spinal fluid in affections of the eye.** *Trans. American Ophthalmological Society*, Vol. XIV, Part i, 1915, p. 205.

The value to be attached to examination of the cerebro-spinal fluid, withdrawn by lumbar puncture, has increased and widened since its introduction some twenty years ago by Quincke. To begin with, puncture was employed only in acute meningitis; but it was then found that chronic inflammatory changes in the nervous system could be diagnosed by its means; and later still, that it was possible to differentiate nerve syphilis from other conditions. Apart from its value in diagnosis, the value of lumbar puncture in treatment is now widely recognised, as seen in the relief of intra-cranial pressure, to say nothing of the administration of certain drugs, as neosalvarsan, by the spinal route.

Ayer, of Boston, Mass., presents the results of examination of the cerebro-spinal fluid in 160 cases of interest to the neurologist and the ophthalmologist alike. In most instances the question simply was: Is this condition syphilitic or not? The question was much more important in early stages than when faced by established disease. For example, the information was vital in cases of slightly unequal or irregular pupils, perhaps some with sluggish reaction, of diplopia, of suspected beginning atrophy, and of forms of headache, epilepsy, and migraine. Under these circumstances, the cerebro-spinal fluid might often betray the existence of a syphilitic process.

The cerebro-spinal fluid was examined in forty cases of external oculo-motor palsy, and only five manifested a normal product. The remainder showed evidence of meningeal irritation, as demonstrated by increased number of cells or of proteids, a positive Wassermann reaction, or gold chloride test. A typical instance of the value of lumbar puncture, when oculo-motor palsy is the sole outstanding symptom, is quoted in a patient of 47 years, who awoke one morning to find the right eye closed. The blood yielded a negative Wassermann reaction, but, on the other hand, the cerebro-spinal fluid gave a strongly positive reaction and a goldsol reaction in the syphilitic zone. Ayer summarises his experience of the cases of oculo-motor palsy as follows:—"In those not congenital or with other obvious cause, usually a manifestation of syphilis of the nervous system. If all tests, blood and spinal fluid, are absolutely negative, the case is probably not syphilis, or represents a run-down process, the signs of which should be evident. In our experience, oculo-motor palsies due to an active syphilitic process are revealed by both positive blood and spinal fluid tests; occasionally the former is more reliable, but more often the latter."

The cerebro-spinal fluid was examined in forty-four cases of primary optic atrophy, and found to be normal in twelve of that number. The atrophy was mostly associated with a true nerve syphilis, as evidenced by a pathological spinal fluid of syphilitic nature.

Lumbar puncture is contra-indicated by the existence of well-marked choked disc. Unless there be some very good reason, it is wiser in these cases to test the Wassermann reaction upon the blood and not upon the cerebro-spinal fluid. In most cases that is adequate.

Of all manifestations of central nervous syphilis, the abnormal pupil is apt to be one of the earliest. But the changes may be so slight as to leave even a careful ophthalmologist in considerable doubt. The newer laboratory tests, however, may be used to determine whether in a given case the pupil indicates active syphilis or not.

Ayer has examined thirteen cases where the Argyll Robertson was the sole sign, and of these, nine gave a positive test for syphilis, usually as regards both the blood and the cerebro-spinal fluid. The negative cases appear to the author to be explained by arrested nerve syphilis. The value of examining the spinal fluid in cases of Argyll Robertson pupils appears to lie in determining whether the disease in a given case represents an aggressive or a quiescent process. In the one contingency, treatment may arrest the malady almost before it has fairly started, as it were, and in the other there is no need of intensive specific medication. In somewhat the same way, too, irregular pupils (usually the result of syphilis) may be shown to be associated with an active or a past infection.

It is usually not difficult to overcome an oculo-motor palsy if treated early, and Ayer has found, as a matter of experience, that a period of six months represents the time limit for complete recovery. He is by no means enthusiastic concerning the treatment of specific optic atrophy. If taken when far advanced, he regards the outlook as absolutely bad, but if taken early, and the process is proceeding slowly, there is a chance that salvarsan may help. Cases of choked disc of syphilitic origin clear rapidly under treatment with "606."—A. C., aged twenty-five years, had a prolonged attack of unconsciousness one year after contracting syphilis, and six months later, when seen by Ayer, choking of both optic discs. The cerebro-spinal fluid showed marked meningeal irritation and a positive Wassermann. The fundi had regained a normal appearance after three doses of salvarsan, each of 0.3 gm. No recurrence during the following two years, and blood and cerebro-spinal fluid have remained essentially normal.

Ayer lays stress upon the danger attending the little operation of lumbar puncture in cases of raised intra-cranial pressure, especially where there is a subtentorial tumour. SYDNEY STEPHENSON.

II.—PATHOLOGY.

(1) Behr.—Contributions to the anatomy and pathogenesis of choked disc. (Beiträge zur Anatomie und Pathogenese der Stauungspapille.) *Bericht de Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(2) Calderaro.—On the opsonic power of the aqueous humour in diabetes. (Ricerche sul potere opsonico dell'umore acqueo nel diabete.) *La Clinica Oculistica*, Gennaio-Aprile, 1915.

(3) Verhoeff, F. H., and Derby, G. S.—Plasmoma of the lacrymal sac. *Archives of Ophthalmology*, May, 1915 (illustrated).

(4) Maestrini.—A study of post-mortem or chill cataract. (Studio sulla cataratta postmortale o da freddo.) *Archivio di Ottalmologia*, May, June, 1915.

(5) Alt, Adolf, and Hardy, W. F.—A large pigment ball between the detached retina and choroid. *American Journal of Ophthalmology*, June, 1915.

(6) Lo Cascio.—On the presence of an oxidising ferment in the choroid; a biochemical research. (Sulla presenza di una tirosinasi nella coroide; ricerche di biochimica.) *La Clinica Oculistica*, Agosto, 1915.

(7) Arganaraz, Raul.—A contribution to the study of the origin of the pigment of sarcomata of the choroid. (Contribucion al estudio del origen del pigmento en los sarcomas de la coroides.) *Boletin de la Soc. de Oftal. de Buenos Ayres*, No. 2, p. 81.

(1) Behr, of Kiel, believes that the site of pressure in choked disc is in the optic canal. The cerebral opening of this canal does not end with a free edge of bone, but is drawn out into a tongue of dura, about 1 mm. to 3 mm. long, which prolongs the roof of the canal on the cerebral side. In all cases of unrelieved florid choked disc, Behr found a pit in the optic nerve corresponding to this little flap. This is the site of pressure. The flap is pressed

by the brain into the nerve, and occludes the lymph passages. The pressure is increased at times, causing those periods of blindness so frequently noted in cases of optic neuritis; eventually, the pressure upon the nerve fibres causes concentric contraction of the fields. A cell growth takes place in the intra-vaginal space and there is a multiplication of the corpora amylacea and multiplication of the arachnoid and dural endothelial cells. Inflammatory signs may be wanting. These cell growths may permanently block the passage between the epicerebral space and the vaginal space. This state of affairs makes all those theories unlikely which ascribe choked disc to the direct transmission of the increased intra-cerebral pressure to the vaginal space. The œdema of the optic nerve ceases at the spot where the dural flap compresses the nerve. It is never found in the intra-cranial part of the optic nerve and the chiasma. Behr has shown that contraction of the bony canal in oxycephalus leads to the same result, papillœdema and œdema of the optic nerve. The œdema of the nerve head is only the ophthalmoscopic expression of general œdema of the nerve itself. All other forms of choked disc, those seen in anæmia, leucæmia, nephritis, etc., are due to over-secretion of lymph and an active lymph stasis. T. HARRISON BUTLER.

(2) **Calderaro** gives the results of a series of experiments made on animals, the subject of artificial diabetes, and compares them with his clinical studies.

As regards clinical notes, he has found that in man the original aqueous has practically no opsonic power, but that the fluid that fills the anterior chamber after the first has been drawn off, has a power about equal to half that of the blood serum; in diabetes the opsonic power of the second aqueous is only about one-fourth of the power of the serum of the same individual. He has noted that the disappearance of the sugar brought about by appropriate diet, is not accompanied by any alteration in the opsonic power.

In his experimental studies he found similar conditions, and concludes that the diminished opsonic power is not due primarily to the sugar, but to the diminished opsonic power of the blood serum. Further, that the increased gravity of pyogenic infections in animals made diabetic by any means, depends on the lessened passage of opsonins into the aqueous and lymphatic spaces of the cornea. He finds, however, that the passage may be facilitated by the injections of fluoride of sodium, which causes changes in the ciliary epithelium. H. GRIMSDALE.

(3) **Verhoeff and Derby**, of Boston, record the notes of what they believe to be the only case of plasmoma of the lacrymal sac yet reported. There have been nine cases of plasmoma of other parts of the ocular structures. They consider that this condition "does not form a pathological entity, but simply represents an early stage of the disease known to previous writers as hyaline and amyloid degeneration of the conjunctiva, of which some 90 cases appear in literature." The pathological picture varies to an extraordinary extent, according to the stage at which the growth is removed. The very early cases show nothing but plasma cells with little or no degeneration, whilst the late ones are characterised by the deposit of large quantities of hyaline or amyloid material. These deposits represent a purely local condition, and are not associated with the general amyloid degeneration of wasting diseases. The writers favour the view that the condition is inflammatory rather than neoplastic. The connection between it and trachoma is held to be more than accidental. The ætiology of the subject is discussed. R. H. ELLIOT.

(4) It has been noticed for some time that in certain young animals, the lenses became partially opaque after death, and that this opacity disappeared

on raising the temperature. The opacity appears first and remain longest in the central part of the lens. **Maestrini**, of Pisa, has found that in some animals in whom this cataract does not appear spontaneously, it is possible to provoke it ; on the other hand, it is not possible to provoke it in many species.

He notes that the measure of the diameter of the lens is a trustworthy guide to the age of the animal. H. GRIMSDALE.

(5) In the case reported by **Alt** and **Hardy**, of St. Louis, the eyeball of a child had received a penetrating injury and had in due course become phthisical. It was examined purely as a matter of routine. The details of this examination are given, but they throw no particular light on the finding of a large ball of dense pigment, so dense that individual cells could not be made out, behind the detached retina and a little posterior to the *pars non plicata* of the ciliary body. The ball measured one millimetre in diameter in the hardened specimen. It was surrounded by an envelope of fibrous connective tissue. At one point the envelope was broken and the pigment cells were spread over the edges to some extent, giving the appearance as if the pigment ball had broken off from the tissue from which it sprang. There is hardly any doubt, the authors say, that this was the pigmented epithelial cell layer. Of the influences at work to produce such a large ball of pigment the authors do not offer any opinion. ERNEST THOMSON.

(6) **Lo Cascio**, of Rome, has investigated the origin of the pigment of the choroid. He has found during these researches that there is, in the normal choroid, a substance which has the power of oxidising similar to the tyrosinases of melanotic sarcomata of the choroid. The result of this oxidation of tyrosin is to form a dark substance. Lo Cascio states that this is the first time that a ferment of this sort has been demonstrated in a normal pigmented mammalian organ, and holds that its presence suggests a method of formation of the ocular pigment from the splitting up of albuminoid bodies. H. GRIMSDALE.

(7) **Arganaraz**, of Tucuman, in this long paper, discusses the various theories which have been propounded from time to time to account for the origin of the pigment in sarcomata of the choroid.

He thinks that the theory which attributes the pigment to alteration of the blood pigment is unsound generally, although in some cases pigment of this origin may be found. The pigment in question is usually iron-free, while pigments derived from the blood are iron-holding. Arganaraz has very rarely been able to find the presence of iron-holding pigment in the specimens which he has examined (once only in thirty). He holds that the pigment is similar to or identical with that held in normal chromatophores of the choroid, although there may be more than one variety of pigment.

Fuchs' theory was that the cells of the sarcoma, being derived from the cells of the choroid, naturally inherit the power of forming pigment by metabolism. He states that the round cells are those which contain most pigment, and that as they withdraw their processes, they become more pigmented, until, finally, the cell becomes a mass of pigment. This is a stage of degeneration. Arganaraz has not been able to confirm this. He has found, on the contrary, the pigment massed in the fusiform cells.

Ribbert holds that the origin of the pigment cells of the melanosarcomata of the choroid is to be sought in the chromatophores—the pigment cells of normal choroid. He thinks that the amount of pigment contained in the cell of the tumour varies with the age of the cell. If this were true, it would seem that all these tumours would be unpigmented at first, and become pigmented later : this is not borne out by clinical observation. He holds, further, that the pigment-cells are the true origin of the sarcoma, and that they have the property of being able to emigrate into the free spaces of the tissues near ; when the spaces are small, the cells by mutual pressure become fusiform ; when there is a little pressure and much space, the cells are round.

Leber, on the other hand, thinks the pigment comes neither from the blood nor from the chromatophores of the choroid, but from the pigmented epithelium of the retina. There is considerable difficulty in accepting this. It is not at all clear how an epithelium, such as the retina, can take on sarcomatous degeneration, and Leber's process can be imagined as taking place in the pigment cells of the choroid more easily than in the pigment cells of the retina.

Arganaraz concludes that the sarcomata of the choroid are "chromatophoromata", and that the pigment they contain is almost always due to the exercise of their normal metabolism. H. GRIMSDALE.

III.—THE COLOUR SENSE.

(1) **Taylor, George H.—A note on colour testing, with special reference to Stilling's plates.** *Ophthalmology*, October, 1914.

(2) **Hegner, C. A.—Congenital unilateral disturbance of the colour sense. (Ueber angeborene einseitige Störungen des Farbensinns.)** *Klin. Monatsbl. f. Augenheilkunde*, January, 1915.

(1) **Taylor**, of Sydney, N.S.W., thinks Stilling's plates the best *single* colour-vision test we have. He tabulates the results of the examination of 200 consecutive cases by this test, comparing the results with those obtained by Holmgren's wools, Williams' lantern, and Nagel's anomaloscope. Some cases are described in detail. A. J. BALLANTYNE.

(2) **Hegner**, of Jena, discusses the literature referring to unilateral colour-vision defects, and records an interesting case.—The patient was found to be red-blind in one eye only. Both eyes presented normal fundi and had full visual acuity. The history given by the patient suggested that the unaffected eye had also, in earlier life, shown defective colour sense, but had improved. This, of course, rested entirely on the statements of the patient, but as he was a student, a good observer, who had done much microscope work, and had occasion to study colour values in connection with staining reactions, some reliance might be placed on his belief. The suggestion that such a colour defect could be improved by training was to be put to the test by an attempt to train the defective eye by similar means.

The writer was led to test the colour sense of fifty patients, chiefly students, by all the exact methods, taking each eye separately. He found that 20 per cent. of them had some colour defect, and that two of them had a pronounced difference between the responses of the two eyes.

A. J. BALLANTYNE.

IV.—THE DEFINITION OF BLINDNESS.

The following is an abstract of a report prepared, at the request of the Local Government Board Departmental Committee on the Welfare of the Blind, by a special committee of the Section of Ophthalmology of the Royal Society of Medicine. The report is signed by Priestley Smith and Leslie Paton as president and secretary respectively of the Section of Ophthalmology. It was amended and approved by the Council of the Section on July 21st, 1915, and was published in the *Proceedings of the Royal Society of Medicine, Section of Ophthalmology*, July, 1915.

The Committee sets out by enquiring what classes of person should be regarded as "practically blind," and at once admits that it is impossible to frame any precise definition which would apply to all cases.

It considers children separately from adults.

As regards children, an authoritative rule is already in existence. In a certain Act of Parliament (56 and 57 Vict., Ch. 42, September 12th, 1893, Section 15) the expression "blind" means "too blind to be able to read the ordinary school books used by children." The Committee does not recommend any modification in this definition, but in connection with it, attention is drawn to three points :

(a) For the proper education of the affected children, it is necessary to distinguish the nature of the defects, which can be accomplished only by one who has special experience of disorders of the eye.

(b) More attention might well be given to the class of children who are too "blind" to read the ordinary school books, but yet too sighted for a Blind School. Such children should be taught in special classes in the ordinary schools.

(c) There is an objection to employing the word "blind" to indicate those children who are educated in the myope school or special classes spoken of above.

As regards adults, in the Bill now before Parliament to provide for the technical education, employment, and maintenance of the blind, the following definition is given.—" In this act, the expression "blind" means too blind in the opinion of the Local Authority to perform work for which eyesight is ordinarily required." The Committee believes that the definition would be free from objection if the framers of the Bill would substitute the word "essential" for the expression "ordinarily required." This change would cover the case of the blind typist or pianoforte tuner. The Committee holds that the certifying authority should not be bound by any precise numerical standard expressing the degree of blindness.

How are applicants for benefit under the Act to be examined and certified as eligible for its benefits? The question, as the Committee points out, is one of great importance to secure equitable working of the Act. In principle, the method, it considers, should be as follows :

(a) Every applicant should be certified as eligible or ineligible by representatives of the Local Authority—that is to say, "the Council of any County or County Borough."

(b) For this purpose, the Local Authority should appoint only medical persons with a competent knowledge of diseases of the eye.

(c) In every case a certificate should be given upon a prescribed form, stating, among other things, whether re-examination of the patient is necessary at a future time.

(d) Certificates should be subject to supervision by an inspector or assessor appointed by the Central Authority of the Secretary of State. There should be a right of appeal to the inspector.

The Committee considers briefly the question of exaggerated or simulated claims, and quotes three cases of the kind. The case of the young man who, on account of imperfect sight, obtained a pass enabling him to travel free by tramcar has its amusing side. For the man was found to be in the habit of riding a bicycle to the place where he joined the tramcar!

Finally, the Committee express a definite opinion that the benefits of the Act should not be extended to persons who unreasonably refuse to take measures for the recovery of their eye-sight. SYDNEY STEPHENSON.

V.—THE BLIND SPOT.

Gradle, Harry S. — **The blind spot.** *Annals of Ophthalmology*, Vol. XXIV, No. 4, October, 1915.

Gradle, of Chicago, contributes a very interesting article on the important and little thought-of topic of the blind spot.

He commences with the history of its discovery by Marriotte in 1668, and brings the subject up to date. The reader cannot fail to be struck with the long delay that occurred before ophthalmology made any use of Marriotte's discovery, and with the many points that are still obscure or unknown in connection with our knowledge of this interesting area. Gradle states that "the peri-papillar bundles, composed of fibres from the retina immediately around the disc, lie in the periphery of the optic nerve directly underneath the pia, throughout its entire course." This view is in accordance with the teaching of Fuchs, but it would have been of interest if the writer had told us whether he had accepted it on that authority alone, or whether he had confirmed it for himself, or was aware of other work confirming it. It is by the way in direct opposition to the statement on the same subject made by Collins and Mayou in their book on the pathology of the eye.

Gradle, for certain clinical purposes, adopts the classification of the optic nerve into the vascular portion, the non-vascular portion, and the canalicular portion. He agrees with Onodi and Loeb that the last-named segment offers a very favourable point of attack, but differs with them as to the method of that attack. Whereas they emphasise the proximity of the sphenoid and posterior ethmoid cells, he champions the view "that the relationship of the soft tissues in and around the optic canal plays the important *rôle* in this disease." The vascular anatomy of the part is dealt with in detail, special stress being laid on that of the vein of Vossius (the *vena centralis nervi optici posterior*). He concludes by saying:—"These anatomic facts explain the course of the disease from the accessory sinus to the optic nerve. The infection, the œdema, or whatever may be the disturbing factor, passes from the sinus periosteum, through the diploic veins and lymph channels, to the orbital periosteum, thence by continuity to the intra-canalicular portion of the dura of the optic nerve, or possibly through the periosteal veins or dural veins directly to the vein of Vossius. If the dura alone is involved, thus causing a pressure upon the periphery of the optic nerve within the canal, the peri-papillar bundles alone will be involved, and an enlargement of the blind spot will result." The reviewer wonders if this is a logical sequence; it suggests itself to him that, in view of the softness and compressibility of the nerve, the pressure exercised by the narrowing of such a canal would be transmitted throughout its structure and would not be confined to its periphery. Is it conceivable that it would expand itself on the periphery of the nerve alone? Such a view seems to be questionable. Is it not more likely that we have to do with an extension of the inflammatory process into the periphery of the nerve? This seems likely from what follows, for Gradle continues: "If the process extends farther and involves the central vein of Vossius, surrounding it by œdema, the neighbouring nerve bundles will suffer. These happen to be the papillo-macular bundles, and their results a central scotoma. Consequently, I believe that I am justified in stating that the anatomic relations of the sphenoid and ethmoid cells to the optic canal are immaterial, when it comes to a question of optic nerve involvement in accessory sinus disease. The trouble is transmitted by the soft tissues alone." On this, one would venture the suggestion that the anatomic relations on which Onodi laid so much stress would favour the extension of just such an inflammatory process as Gradle describes, even if the thin layer of intervening bone itself escaped involvement.

The work of Cantonnet and of Bjerrum on the significance of the enlargement of the blind spot in an outward direction in malignant myopia, is next dealt with. This is attributed to peri-papillary atrophy, one phase of this atrophy, *viz.*, the choroidal, is revealed by the ophthalmoscope, but the extent of the retinal atrophy can be measured only by the perimeter. Gradle finds that it does not always correspond with the ophthalmoscopic picture, but that it goes hand in hand with a gradual decrease of the visual acuity, irrespective of the degree of myopia.

In speaking of the changes in the blind spot area in glaucoma, Gradle makes no mention of the work of Seidel on paracentral scotomata. The reviewer's own interest in the subject may have made him over-critical, but he feels that the great interest of blind spot measurements in this disease demands more than the scanty notice Gradle has given it in an otherwise very interesting communication.

Gradle does not agree with Landolt and Kleczkowski in their finding that the blind spot is enlarged in eyes presenting medullated nerve fibres. If such enlargement there be, he holds it must be only relative, and not absolute. He has however only investigated one case, and his views seem to be founded on theoretical rather than on practical considerations.

He next notices the work of various observers on the spindle-like enlargement of the blind spot above and below the vertical meridian, in cases of sympathetic ophthalmia, and mentions that Holt was inclined to ascribe it to an intoxication of the optic nerve from resorption of products of inflammation within the eye.

The observation of Epeelers that in eclipse blindness, there is found an enlargement of the blind spot out of proportion to the other clinical phenomena of the disease, is recorded.

The views of a number of ophthalmologists are given, both on the clinical phenomena observed, and on the causation of those phenomena in toxic amblyopia. Gradle thinks that opinion is fairly settled on certain subjects, *viz.*, (i.) that the diagnostic feature of a tobacco or alcohol amblyopia is a relative central scotoma, that may or may not include the blind spot; (ii.) that the disease is due to a toxæmia of the bundles within the optic nerve itself; (iii.) that combined involvement of the peri-papillar and papillo-macular bundles is a matter of chance; and (iv.) that any enlargement of the blind spot is apt to be irregular both in size and direction.

Lastly, the history and clinical aspect of involvement of the blind spot from accessory sinus disease is considered. A perusal of this very interesting section serves to show that we still have a great deal to learn under this heading.

The final section deals with the size and location of the blind spot, and with the methods in vogue for measuring it. Gradle describes his own method, in which the screen is white, and the test objects are dark steel balls rolled along by means of a magnet worked on the reverse side.

A communication on the subject of Gradle's findings as to the normal and pathologic blind spot is promised at an early date. R. H. ELLIOT.

VI.—QUESTIONS CONCERNING LIGHT.

(1) **Stock.—On the question of dark glasses. (Zur Frage der Schutzbrillen.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(2) **Clarke, Ernest.—Clinical lecture on photaugiaphobia.** *Med. Press and Circular*, August 4th, 1915.

(3) **Burge, W. E. and Neill, A. J.—The protection of the normal crystalline lens against the harmful effects of ultra-violet light.** *Archives of Ophthalmology*, Vol. XLIV, No. 5, 1915.

(4) **Butler, T. Harrison.—Industrial diseases caused by light, and their prevention.** *Birmingham Medical Review*, October, 1915.

(1) **Stock**, of Jena, described and demonstrated to the Heidelberg Congress some new dark glasses made by Zeiss. The great drawback of the ordinary type of smoked glass, which Stock says are the most satisfactory protective glasses, intercepting, as they do, most of the ultra-violet rays, is that they are darker in the centre in the case of convex lenses because the glass is thicker, and brighter in the centre in the case of concave glasses. The Jena firm has overcome this by cementing a parallel plate of smoked glass upon a plano-convex or plano-concave lens. These glasses can be made as compound lenses, and the punctate depiction principle can be embodied in them.

T. HARRISON BUTLER.

(2) **Clarke,** of London, has coined the word "photaugiaphobia" to express a shrinking from the glare of light, such as is particularly the case in albinos. It is a much more prevalent symptom than is generally thought. An extreme instance of the harm that may be done by glare is to be found in the so-called "eclipse blindness" or "electric retinitis," where changes can actually be seen with the ophthalmoscope in the retina (and choroid). Among the other conditions set up in the eye by glare may be mentioned cyclitis and traumatic conjunctivitis, sometimes accompanied by erosions of the cornea. The author explains how the one-time treatment of photaugiaphobia by smoked or coloured glasses is likely to be replaced by the glasses evolved from Sir William Crookes' experiments. At present two kinds of this glass are upon the market, namely, "A" and "B." Crookes' "A" cuts off 27 per cent. of the heat rays, practically all the ultra-violet rays, and transmits 99 per cent. of the light. In Clarke's opinion, "it is just the ideal glass for photaugiaphobia," and Clarke strongly recommends it, not only in the alleviation of glare, but also in the correction of myopia. On the other hand, Crookes' "B" is especially indicated when very great glare or heat is encountered.

Clarke's very practical communication concludes with an enumeration of the details that deserve attention in a case of photaugiaphobia—for example, the protection of the eyes against glare from above in the bright weather, the choice of house illuminants, the decoration of rooms, and the position of the bed in dormitories, and of the desks in class-rooms. SYDNEY STEPHENSON.

(3) **Burge**, of the Nela Research Laboratory, and **Neill**, of the Laboratory of the University of Illinois, made a number of experiments to ascertain how far the crystalline lens is protected against the action of ultra-violet light. They found as follows :—(1) cataract cannot be produced in excised eyes by means of radiant energy from any part of the spectrum, provided the heat effect is excluded ; and this, even when the conditions were far more extreme than any the human eye has to face under commercial conditions. (2) The lens protein can be so modified by weak solutions of the salts that are to be found in cataractous lenses and by dextrose, as to enable ultra-violet radiations to produce coagulation and cataract. (3) The substances which modify the lens protein, so that ultra-violet radiations can produce opacity, also decrease the fluorescence of the lens. (4) Fluorescent bacteria are more resistent to the action of ultra-violet radiations than are non-fluorescing organisms. (5) A provisional hypothesis is advanced that the great resistance offered by the lens and by fluorescing bacteria, may be due to this power of fluorescing. The assumption is that the lens and fluorescing bacteria, by converting the absorbed short waves into longer waves, get rid of more or less of the energy which otherwise would have been spent in coagulating their protein.

The paper is not very convincing from a clinical standpoint, although of considerable interest as a contribution to abstract knowledge. There seems to be an underlying assumption that glass-blowers' cataract is at one in its ultimate ætiology with ordinary cataract, and, again, that coagulation of the lens protein is the change which occurs in the formation of a cataract. Again, the suggestion that the findings of silicates in the Indian cataracts indicates that the presence of these salts is pathologic, seems to require control by the examination of normal Indian lenses. The staple diet of the East must not be forgotten in this connection. The reviewer would be most reluctant to offer any remarks which could be taken as in disparagement of a very interesting communication. Possibly he has taken the statements up otherwise than as they were intended, but they leave him with an uneasy sense that the experimental value of the paper is in excess of its clinical worth.

R. H. ELLIOT.

(4) **Butler**, of Birmingham, glances at the several kinds of injury to workmen's eyes liable to result from the action of glare, infra-red rays, and ultra-violet radiations, and then shows how protection might be secured by various kinds of glasses. He gives interesting details of Sir William Crookes' famous glasses, and says it is possible to select a glass suitable for every purpose of protection from the series. Scientific results, however, have been sterilised by commercialism. The only two formulæ at present in use are manufactured solely by a well-known Birmingham firm, and the whole of the product appears to be taken by a Trans-Atlantic Company. By the last-named they are retailed at a high price. "Euphos" and "Akopos" glasses are mentioned. Butler is at a loss to explain the curious observation brought before the Oxford Ophthalmological Congress in July, 1915, by Edgar Collis, namely, that the goggles used by electric welders, when examined after use, are found to show metallic particles on both sides of the glass.

SYDNEY STEPHENSON.

VII.—HETEROPHORIA.

(1) **Riseley, S. D.—Anomalies of refraction and their relation to abnormalities of ocular balance.** *Ophthalmic Record*, July, 1912.

(2) **Gibbons, Edward E.—Management of hypereso- and hyperexophoria.** *Ophthalmology*, July, 1913.

(3) **Mitchell, S.—Diagnosis of heterophoria from a portrait.** *Ophthalmic Record*, May, 1914.

(4) **Holt, E. E.—Abraham Lincoln.** *Ophthalmic Record*, August, 1914.

(5) **Reber, Wendell.—Heterophoria: the present status of the question. (L'hétérophorie: état actuel de la question.)** *La Clinique Ophtalmologique*, octobre, 1914.

(6) **Howe, Lucien.—Unanswered questions concerning heterophoria and heterotropia.** *Ophthalmic Record*, November, 1914.

(7) **Savage, G. C.—Heterophorias and their treatment.** *Ophthalmic Record*, November, 1914.

(8) **Landolt, Edmond.—Insufficiency of convergence: its diagnosis and treatment.** *Ophthalmic Record*, December, 1914.

(9) **Marlow, F. W.—The determination of the relative position of rest by prolonged occlusion of one eye.** *New York State Journal of Medicine*, November, 1915.

(1) **Riseley**, of Philadelphia, discusses the anatomical, physiological, and optical factors which are necessary to the comfortable maintenance of binocular vision, and the relation of accommodation to convergence and its disturbance under various circumstances. He gives sound advice on the means of diagnosing and treating cases of relative and absolute insufficiency. It is a paper full of interest and practical utility, and should be consulted in the original.

J. JAMESON EVANS.

(2) **Gibbons**, of Baltimore, recommends, for the purpose of diagnosis, the use of Maddox's double prism with its base horizontally crossing the pupil of one eye, and a red glass before the other eye. With this arrangement the patient sees two white lights and a red one in a vertical series. By noting the relative positions of these, the vertical and horizontal deviations can be simultaneously observed and measured.

In prescribing for the correction of the errors, he uses a prism equal in strength to the sum of the two deviations. To arrive at the position of the prism, he divides 90 degrees by the sum of the deviations, and multiplies the quotient by the number of degrees in the vertical deviation. This, he says, gives the number of degrees through which the prism must be rotated from the horizontal, in order to obtain the combined effect. When this has been arrived at, the prism correction can be divided between the two eyes.

A. J. BALLANTYNE.

(3) **Mitchell**, of Hornell, has examined a number of portraits of President Lincoln and finds that they all show the presence of a hyperphoria of the left eye. He thinks this muscular defect, and a possible uncorrected error of refraction, may have contributed towards the change in his life " from a rude and reckless Mississippi boatman to the thoughtful, studious lawyer that

he afterwards became." The corrugation of the brow, resulting from the same cause, may also account in part for his expression of ineffable sorrow which has been described. J. JAMESON EVANS.

(4) **Holt**, of Portland, finds confirmatory evidence of this heterophoria in the fact that Abraham Lincoln suffered from vertical diplopia (described as an " illusion ") after his election as President in 1860, as recorded in *Harper's Magazine*, July, 1865. J. JAMESON EVANS.

(5) Readers of THE OPHTHALMOSCOPE will remember a series of exhaustive articles by **Reber,** of Philadelphia, which appeared in our columns in 1914. The communication in *La Clinique Ophtalmologique*, which bears no evidence of being an editorial synopsis, résumés the subject in five pages, presumably by Reber himself. S. E.

(6) **Lucien Howe,** of Buffalo, N.Y., suggests a number of questions relative to the ocular muscles which require solution, and calls upon American ophthalmologists to come forward to help to solve them, and so maintain the lead they have given in regard to methods of diagnosis and treatment of muscular anomalies.

The following are some of his questions :—

1. What relation does the size of a given muscle bear to heterophoria or heterotropia ?

2. What relation does the line of the principal insertion of a given muscle bear to heterophoria or heterotropia ?

3. What relation do the " secondary " insertions of a given muscle bear to either of these conditions—especially to heterotropia and operations for its cure ?

4. How can we best measure the extent and character of an arc of rotation by objective methods, especially with—(*a*) The modified Stevens' phorometer ; (*b*) The improved perimeter ; (*c*) By photographing the rapidity of the lateral swing ?

5. How can we measure the extent and character of such a swing by subjective methods ?

6. How do either or both of these methods assist us in determining whether a given degree of heterophoria or heterotropia is of the active or passive type ?

7. What amount of lenticular astigmatism is indicated by the irregular movements of the entoptic images during accommodation when these movements are measured by Tscherning's phacometer ? And what is the relation of this lenticular astigmatism to esophoria or exophoria ?

8. How exactly can we measure a slight spasm of accommodation (*a*) by the approach of the near point (*b*) by plotting the curve on a system of co-ordinates which shows the too tardy action of a minimum dose of atropine, or (*c*) by plotting the curve, showing the too rapid action of a minimum dose of eserin ?

9. How exactly can we measure even a slight paresis of the accommodation by reversing the processes just mentioned ?

10. With the optometer made for these measurements, what is the positive part of the relative accommodation in esophoria of a given degree ? What in exophoria ? etc., and what is the negative part in each ?

11. What is the positive part of the relative convergence ? And the negative part ?

12. What is the fatigue curve of convergence in a given form and degree of esophoria and exophoria ?

13. What is the fatigue curve of accommodation under similar conditions ?

14. Which is the more important factor in a given case ?

15. What is the relation of so-called asthenopic symptoms to processes of assimilation and nutrition. J. JAMESON EVANS.

(7) **Savage**, of Nashville, Tenn., affirms that the study of ocular muscular functions has been retarded by Helmholtz's error in locating the poles of the eye, the ascribing of all muscular defects to errors of refraction, and by the use of unscientific instruments for the detection and measurement of muscle error, particularly binocular phorometers and the Maddox rod.

He describes and illustrates the monocular phorometer and his muscle indicator. Of the latter he says, "There is no phase of a single ocular muscle, or any combination of ocular muscles, normal, abnormal or pathologic, that it cannot show."

His contention is, that all true knowledge of the ocular muscles is based on the fact that there is a binocular special field of view which contains a binocular pole, and binocular meridians and parallels, and that the existence of this field, with its component parts, depends on the fact that the centre of the macula is the posterior pole of the eye.

As to how these principles are applied in the investigation and treatment of muscular anomalies, the reader must be referred to the original.

J. JAMESON EVANS.

(8) **Landolt**, of Paris, describes his method of investigating the power of convergence by means of his ophthalmo-dynamometer. He sums up as follows: "to determine whether a patient's convergence is or is not sufficient for his needs, we first estimate the number of metre angles corresponding to his usual working distance. Then we ask ourselves whether this amount is less than one-third of the working force required. If not, he may work without extrinsic muscular strain. In other words, if we find with asthenopic symptoms that one-third of the positive convergence is not below the number of metre-angles required by the patient's usual working distance, then it is highly probable the cause of the asthenopia is outside of the external muscle apparatus."

In the treatment of insufficiency of convergence, the use of prisms is generally unsatisfactory, except occasionally in very mild cases.

"It is generally the case that the convergent defect is more than one metre-angle. In this instance there is little to be gained by resort to purely optical means for its relief; it is better to endeavour radically to increase the convergent power. Apart from rest, attention to general condition and other hygienic measures—all of which are important, and should ever be borne in mind in the conduct of all these cases—*operative measures are the most effective*," and the operation of election is advancement of one or both internal recti, which is logical, and one that infallibly augments convergence without interfering with the almost equally important relative divergence power. In other words, it brings about the normal relations of convergence and divergence.

A simple advancement of one internal rectus, without tenotomy of an antagonist, may increase the convergent power from 3 m.a. to 20 m.a., but of this the patient will only use the amount required for comfortable near work.

Landolt always advances the tendon of one internal rectus to the corneal margin, as an apparent excess of operative convergence is not vital in these cases. "Moreover, the extrinsic ocular muscles are not rigid bands of tissue to be mathematically measured by a millimetre rule; and one cannot surgically place them here or there as if they were pieces of metal. It must not be forgotten, either, that there are other considerations (tonus, innervation, etc.) besides length and position of an advanced tendon to be considered." J. JAMESON EVANS.

(9) **Marlow,** of Syracuse, N.Y., emphasises the importance of a determination of the position of equilibrium of the eyes in every case of asthenopia.

The tests employed may be classified into three groups. 1. Those which produce an artificial diplopia by prisms, with observation of the relation of the two images to one another. 2. The production of so great a dissimilarity in the form of the two images that fusion is impossible, as with the Maddox rod. 3. The complete abolition of binocular vision by occlusion of one eye, as in the screen and cover test, this method having the great advantage of making both an objective and subjective measurement possible. Marlow considers that greater reliance can be placed on this last test than on the others. He regards his prolonged occlusion test as simply an extension in point of time of the "cover test."

Prolonged occlusion is not a method for routine use. The average patient would not tolerate it. Yet cases occur in which no improvement follows the most accurate correction of both refraction and heterophoria.

After prolonged occlusion of an eye, a heterophoria may become manifest which could not be detected by the ordinary tests, or a previous defect in balance may be intensified.

Marlow occludes the worse eye with a ground glass for several days up to ten days. The deviation is then measured in the ordinary way with the Maddox rod. A tabulated list of successful cases is given.

The question may be asked—Is a deviation which appears only after prolonged occlusion worth correction?

And again we may enquire—why should we take so much pains to measure the exact angle of a heterophoria when it is apt to vary greatly in degree from time to time, and when the proportion of the error which we actually correct is decided upon purely empirical grounds, and, indeed, is often only arrived at by a process of trial and error? T. HARRISON BUTLER.

VIII.—OPERATIONS.

4.—Removal of the Eyeball.

1 Wright, Hal R.—The use of the snare as the final step in the **enucleation of the eye.** *Ophthalmic Record*, September, 1914.

2 Gradle, Harry S.—Concerning removal of the eyeball. Ciliary ganglion anæsthesia. *Archives of Ophthalmology*, May, 1915.

3 Sweet, William M. Some experiences in enucleation under local **anæsthesia.** *Trans. American Ophthalmological Society*, Vol. XIV, Part 1, 1915, p. 98.

(1) **Wright,** of Columbus, Ohio, advocates the use of a string snare that can be operated with one hand, as the instrument of preference for dividing the posterior vessels and nerves as the final step in the enucleation of the eye. After the conjunctiva and the muscles have been divided, and all posterior attachments, except the vessels and nerves, are free, the loop is passed back over the globe, the eye is grasped with fixation forceps and the snare is slowly closed until the ball is free. In this way less blood is lost, and the field of operation shows a beautifully dry socket. J. JAMESON EVANS.

(2) **Gradle,** of Chicago, in his third article devoted to questions bearing on

"Removal of the Eyeball," strongly advocates the use of ciliary ganglion anæsthesia. The *technique* is fully described.—The injected fluid consists of 2 cc. of a solution of novocaine (1 per cent.), "to which a small amount of adrenalin has been added." It is necessary to inject cocaine or novocaine solution under the conjunctiva covering the lower third of the bulb, as this area is not supplied with nerves by the ciliary ganglion. In "ruptured panophthalmitis" the method is considered unsafe, because of the danger of driving infective material farther into the orbit. A high degree of neurasthenia is said to be a contra-indication to the use of the local anæsthetic method. The suggestion that "eyes are better enucleated under local anæsthesia, thereby preventing the possibility of operating on the sound eye," comes as a shock to the surgeon, whose methods are of the usual type. It can have no real weight with so excellent a surgeon as we know Gradle himself to be. There is a factor which is ignored throughout this paper, *viz.*, the shrinking that even a courageous man has from such an operation as the removal of the eye. To be sent to sleep and to wake up and find it is all over, means very much indeed to most people. Are the risks from general anæsthesia such as to outweigh this important consideration? The decision must rest with the surgeon. The reviewer knows what his own answer would be, if he spoke from the table, instead of from alongside of it. R. H. ELLIOT.

(3) **Sweet,** of Philadelphia, describes the various methods of removing the eyeball under local anæsthesia adopted by Meyer (1905), Bruns and Robin (1906), Siegrist (1907), Seidel, and Elschnig (1908). He employed the ciliary ganglion method of Elschnig in 1912, and reported the results in nine operations before the Section on Ophthalmology of the College of Physicians of Philadelphia. The method followed in those cases was that described by Löwenstein, of Elschnig's clinic.—A Pravaz syringe was usually employed holding 1 c.c. of liquid (1 per cent. cocaine hydrochloride in salt solution, with four drops of adrenalin, 1.1,000, to each syringeful). The conjunctiva was anæsthetized by three instillations of a 4 per cent. solution of cocaine, made three minutes apart. The external canthus was then pulled well outwards, and the point of a somewhat thick needle, 5 cm. in length, was entered close to the external orbital margin along the lower border of the external rectus muscle, and pushed obliquely inwards towards the median line until not more than ½ cm. of the needle remained visible. One-half of the contents of the syringe was then injected. If the fluid had reached the right spot, pressure made half a minute later upon a tender and inflamed eyeball gave rise to no sensation of pain. The rest of the contents of the syringe was then injected into the same situation. But in case of any tenderness of the eyeball, the needle was slightly withdrawn, pushed forward again in some other direction, and the balance of the liquid injected. The needle was withdrawn, the syringe again filled with the solution, and about four minims injected near the insertion of each of the recti muscles. Operation was commenced in about five minutes.

The last patient, a woman, aged 75 years, upon whom the foregoing method was employed, developed rather alarming nervous phenomena after the orbital injection, and for a time Sweet abandoned local anæsthesia for enucleation. But later he adopted Siegrist's method in twelve cases with satisfactory results. Briefly, a 1 per cent solution of novocaine with adrenalin was injected at the insertion of the four recti, and from 1 c.c. to 2 c.c. of the same solution in the region of the optic and ciliary nerves. In injecting the solution behind the globe, the needle is entered first along the lower border of the externus and then along the lower border of the internus.

Sweet terminates his communication, as follows:—"When there is, however, no contraindication to general anæsthesia, and the operator has a trained assistant to give the ether or chloroform, it is probable that in this country the older method will be the one most generally followed." Those words correctly represent also the feeling general in Great Britain.

SYDNEY STEPHENSON.

5.—Eyelids.

(1) **Lamb, Robert Scott.—External canthotomy.** *Ophthalmic Record*, September, 1914.

(2) **Appleman, L. F.—Ectropion of the eyelids corrected by skin grafts.** *Ophthalmology*, October, 1914.

(3) **Truc, H.—Surgical treatment of spontaneous retraction of the upper eyelids. (Traitement chirurgical de la rétraction spontanée des paupières supérieures.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(4) **Axenfeld, Th.—External blepharotomy during the operation for cataract. (Blepharotomia externa während der Staroperation.)** *Klin. Monatsbl. f. Augenheilkunde*, January, 1915.

(1) **Lamb**, of Washington, makes a plea for the more frequent use of external canthotomy as an accessory in the treatment of corneal ulcers, gonorrhœal ophthalmia, Parinaud's conjunctivitis, or whenever the *hoe-like* action of the lids tends to prevent the healing over of the corneal epithelium or the pressure and disintegrating effects of marked hypertrophied follicles of the palpebral conjunctiva moving over the cornea require to be avoided. The author stipulates that canthotomy should be employed in the early stages of the diseases, when its effect is remarkably efficacious—particularly gonorrhœal ophthalmia, whether in adults or in children. He uses it, as soon as the patients are seen, in all cases of gonoccocal conjunctivitis, in which the effects are immediate and the facilities for cleansing the fornices are greatly increased thereby. In all cases it should be employed as a first resort, not as a last.

J. JAMESON EVANS.

(2) The case described by **Appleman**, of Philadelphia, is that of a coloured man who received extensive burns as the result of an explosion. The ultimate result was a pronounced cicatricial ectropion on both sides. A fairly good result was obtained by freeing the everted lids in the usual manner and covering the exposed raw surfaces with whole skin grafts from the arm.

A. J. BALLANTYNE.

(3) The spontaneous retraction of the upper eyelids referred to in this contribution by **Truc**, of Montpellier, is a relatively rare condition due either to contraction of the levator muscle or to shortening of the subjacent fibrous tissue. It may be uni- or bilateral, congenital or acquired. Truc has seen two cases. His operative procedure consisted in an incision along the upper border of the tarsus including the levator and all the tissues except the palpebral conjunctiva. In one case the section was an open one, in the other it was subcutaneous. One of the immediate results was ptosis, but this passed off and the lid position became normal.

A. J. BALLANTYNE.

(4) The device referred to by **Axenfeld**, of Freiburg, is not new, but is worth bearing in mind. In the extraction of cataract, difficulty may be experienced in the making of the incision, either from natural narrowness of the palpebral fissure, from tightness of the lids (if there is prominence of the eyeball), or from sinking of the eyeball, causing the lids or the external canthus to come in the way of the knife. In such cases, after the injection of a local anæsthetic, the external canthus may be split as far as the orbital margin. The procedure is painless, it makes the operation easy, and the wound heals readily under the dressing, without stitches, and does not interfere with the smooth healing of the corneal incision.

A. J. BALLANTYNE.

6.—Keratoconus.

(1) **Gibbons, Edward E.—Keratoconus.** *Ophthalmology*, October, 1914.

(1) The patient referred to in the contribution of **Gibbons,** of Baltimore, was a healthy young man, twenty-five years of age, who had been engaged in farm work all his life. The treatment employed was cauterisation of the apex of the cone over an area three millimetres in diameter, using a globular point, and avoiding actual contact with the cornea. This was followed several months later by an iridectomy downwards and inwards. When first seen, the refraction was myopic 36 dioptres, with irregular astigmatism, and V.A. in each eye was 12/200. The final result gave V.A.R. 20/50, V.A.L. 20/40, with—5D. cylinders. A. J. BALLANTYNE.

7.—Corneal Fistulæ.

(1) **Bey, Sameh.—Corneal fistulæ and iridectomy.** *Ophthalmology*, July, 1913.

(2) **Kuhnt, H.—Upon the treatment of corneal fistulæ. (Zur Behandlung der Fistula Corneae.)** *Zeitschrift für Augenheilkunde*, Vol. XXXII, p. 421, 1914.

(1) **Bey,** of Cairo, has performed iridectomy sixty-five times for corneal fistula. He gives here the results of five cases in detail, showing a permanent cure in each case after treatment by other methods had failed to produce lasting closure of the fistula. A. J. BALLANTYNE.

(2) **Kuhnt,** of Bonn, having noted that Leopold Mueller had stated that he had not had good results from Kuhnt's operations for treating corneal fistulæ, explains his procedure with the aid of diagrams. He states that three pathological conditions are necessary to produce a corneal fistula. First the edges of the ulcer must, in a greater or less degree, lack that disposition to heal which should be present in a perforating ulcer. Secondly, Descemet's membrane must have become impacted in the wound ; and, finally, there must be a relatively rapid advance of the corneal epithelium into the depths of the wound. If the epithelium cells form a junction with Descemet's membrane, it is not possible for the fistula to close spontaneously. From time to time these fistulæ open and allow the aqueous to escape, giving rise to many

varieties of ocular irritation with defective vision. After a longer or shorter interval, the anterior chamber refills again. This alternation may be frequently repeated, and may ultimately lead to blindness.

Kuhnt finds that the best treatment is to cover the fistula with conjunctiva. In the case of a peripheral fistula the bluish-white conjunctiva must be removed from the neighbourhood of the fistula with the galvano-cautery or with a special knife, gauge, and repositor. A flap of conjunctiva is now separated and brought to cover the fistula. It must be well pressed into the aperture, and secured by sutures. The flap may have a single or double peduncle. It must always be cut so that it lies in a vertical direction, for if it be placed horizontally, it will be displaced by the movements of the lids. In the young or middle aged this procedure is almost invariably successful, but in the aged it is advantageous to perform paracentesis close to the fistula, so as to reduce the intra-ocular pressure. If the fistula be central, Kuhnt introduces a small flat spoon into the anterior chamber to support the back of the cornea while it is cauterised or scraped.

Kuhnt has operated upon seventeen fistulæ by this method. In sixteen the operation was immediately successful. He knows of no disadvantages.

T. HARRISON BUTLER.

8.—Dislocated Lens.

Paine, Howard S.—A successful method for the removal of a fully dislocated (lost) lens, heretofore considered and referred to by authorities as "impossible of extraction," together with five cases. *Annals of Ophthalmology*, July, 1915.

Paine, of Glens Falls, makes recommendations for the removal of dislocated lenses, which may be summarised thus.—Use a single strong source of light and a three-inch focus condenser, and illuminate the eye, so that you can see what you are doing; (2) employ such instruments as will get the lens to the surface with a minimum of disturbance of the vitreous (a Smith elevator and a tiny hook are recommended for the purpose); (3) avoid lid pressure by the use of suitable instruments and by correct manipulation; and (4) do not look on any of these cases as hopeless. It would be a mistake to review the paper in detail, as it would possibly lead to many being content with the summary, who would benefit by perusing the original. Behind it all there lies the practical touch that is never absent from the class of work which makes for real progress, and which is an inspiration to those who read. None the less, there are statements in the paper with which one finds it hard to agree, *e.g.*, "Every eye containing a luxated lens surely becomes pathologic." The reviewer has seen eyes which had retained good vision for eight, nine, and even, on two occasions, for ten years, after the lenses had been couched by an Indian operator. Such a criticism does not seriously detract from the value of the communication, which is worthy of the careful study of every operating ophthalmologist. R. H. ELLIOT.

IX.—REMEDIES.

(*Second Notice.*)

(1) **Ohm, J.—Upon the value of scarlet red ointment in certain trachomatous ulcers of the cornea. (Ueber den Heilwert der Scharlachrotsalbe bei gewissen trachomatösen Hornhautgeschwüren.)** *Zeitschrift f. Augenheilkunde*, January-February, 1915.

(2) **Hudson, A. C.—Case of sympathetic ophthalmitis treated by intravenous injections of salvarsan and neo-salvarsan.** *Proceedings Royal Society of Medicine* : *Section of Ophthalmology*, July, 1915.

(3) **Allan, John.—The value of mercuric cyanide in eye affections in children.** *The Prescriber*, October, 1915.

(4) **Terry, Robert J., and Wiener, Meyer.—The mydriatic action of dextrohyoscyamin.** *Annals of Ophthalmology*, October, 1915.

(5) **Bordley, James, Jr.—Malignant uveitis, treated with thyroid extract.** *Archives of Ophthalmology*, November, 1915, and *Trans. Amer. Ophthal. Society*, Vol. XIV, Part I, 1915, p. 232.

(6) **Swift, George.—Dionin in the treatment of vernal catarrh.** *Ophthalmic Record*, December, 1915.

(7) **Knapp, Arnold.—Salvarsan in interstitial keratitis and in optic nerve lesions.** *Trans. Amer. Ophthal. Society*, Vol. XIV, Part I, 1915, p. 124.

(8) **Harry, Philip A.—Melargen in ocular therapeutics.** *The Prescriber*, December, 1915.

(9) **Tweedy, Sir John.—On the use of solutions of quinine as a dressing for infected wounds.** *British Medical Journal*, January 1st, 1916.

(1) **Ohm**, of Bottrop, has found that scarlet red ointment is useful in preventing ulcers of the cornea after the Heisrath-Kuhnt operation for trachoma, as well as in curing infiltrated ulcers in trachomatous subjects. The prescription is as follows :—

Scarlet red (Michaelis), 0·5.
Olive oil rubbed down with pure white American vaseline, 10·0.

Sydney Stephenson.

(2) The patient whose case is related by **Hudson**, of London, a male, aged 19 years, was struck in one eye by a flying fragment while chipping mosaic with hammer and chisel. Sixty-eight days after the accident, the sight of the other eye became misty. Differential blood-count showed 9 per cent. of large lymphocytes amongst leucocytes. Seventy-eight days after the injury, the first eye was excised, and the anterior part of the uveal tract was found to present histological appearances typical of sympathetic ophthalmitis. Between December 20th and February 4th, three injections were made of salvarsan (0·5 grm. to 0·6 grm.) and one of neo-salvarsan (0·9 grm.). The result was gratifying. Vision, reduced to fingers at two metres when the treatment was commenced, had become normal some four months later.

Sydney Stephenson.

(3) **Allan**, of London, recounts three cases of hypopyon-keratitis in

children treated successfully by the subconjunctival injection of a few drops of solution of mercuric cyanide (1 : 2,000). SYDNEY STEPHENSON.

(4) **Terry** and **Wiener**, of Washington University, have found that dextrohyoscyamin (which does not exist in nature), when dropped into the conjunctival sac, dilates the pupil to the maximum, and at the same time has very little, if any, effect upon accommodation. Thus, a ½ per cent. solution caused dilatation of the pupil in about forty minutes, and the mydriasis passed away in twelve hours on the average. The dilatation obtained was from 5·5 mm. to 8 mm. A marked effect upon accommodation followed the employment of solutions that were not quite fresh, the dextrohyoscamin rapidly changing to the lævorotary form under these circumstances, which acted upon the accommodation like atropin. This may be got over by using the solution fresh, or by employing the tabloids prepared by the firm of Burroughs, Wellcome, & Co. The medicament is said to act more quickly and effectively than euphthalmin. Its only drawbacks, as stated by the authors, is its unstable quality in solution, or, if used as a tabloid, the burning sensation that it excites. SYDNEY STEPHENSON.

(5) The principal interest of this paper by **Bordley, Junior**, of Baltimore, lies in the fact that it is an additional piece of evidence that ophthalmologists are waking up to the importance of seeking out and treating the cause of inflammation of the uveal tract in each individual case that comes before them in their practice. Formerly, it was sufficient to label a case "iritis," "choroiditis," "irido-cyclitis," etc., and the surgeon felt his duty had been done, and he was free to apply general and local treatment—mostly the latter. Now all that is changed, and it is realised, by the more wakeful at least among us, that the class-labelling of the affection only begins our labours for the patient's welfare. Every avenue must be searched in the effort to trace the method of entry of the poison which we believe to be responsible for the trouble. The passage of years is continually opening up to us the possibility of new channels of auto-intoxication, and so enabling us gradually to lessen the number of "cases which defy all treatment." Looked at in this light, Bordley's communication is both interesting and stimulating. In the type of severe uveitis which he describes, he has had good results in no less than four out of eight, and doubtful results in two more by using thyroid extract. He does not, however, pretend that all such cases are necessarily a symptom of cretinism or of myxœdema, *ex. gr.*, he has seen one case, which, after a pan-hysterectomy, resisted thyroid treatment, but soon yielded to the administration of ovarian extract. The inclusion of the extracts of the ductless glands in our therapeutic armamentarium is a valuable step in advance, and should serve still further to reduce the number of cases of uveitis "which prove resistant to all known forms of treatment." If a suggestion may not be considered ungracious under the circumstances, it would be that the term "malignant" is liable to be misunderstood, when it is applied to such cases as those now under discussion. "Severe" would probably meet the point. R. H. ELLIOT.

(6) **Swift**, of Seattle, Wash., strongly recommends that 5 per cent. dionin solution be dropped into the eyes three times a day in cases of spring catarrh. The primary reaction caused by the remedy he characterises as "terrific." The itching, the drooping of the eyelids, and the dulness of the cornea readily respond to dionin, but the result as regards the conjunctival lesions is not so pronounced. SYDNEY STEPHENSON.

(7) **Knapp**, of New York, has a suggestive communication dealing with the treatment by salvarsan of interstitial keratitis and of some lesions, as atrophy and neuritis, of the optic nerve.

The patients suffering from interstitial keratitis were admitted to hospital, and treated in a uniform way. Thus, they were given inunctions of mercury and small doses of potassium iodide, and five injections of neosalvarsan in one-half doses were made at intervals of three days. An interval of two weeks was allowed to elapse. Salvarsan was then given in one-half doses every three days on five occasions. The mercury and potassium iodide were continued. Knapp finds, as the result of his experience, that the inflammatory manifestations of interstitial keratitis are quickly overcome, and that salvarsan acts best in inflammatory cases. On the contrary, its action is but slight when corneal infiltration is not accompanied by vascularity. Most of the cases seem to do better than under the older treatment. In most instances the result, if the treatment be persevered in, is most encouraging. Salvarsan, however, did not always prevent the second eye from becoming affected. Improvement in the general health was very noticeable.

Two cases of optic neuritis improved under treatment by neosalvarsan, mercury and potassium iodide being administered at the same time.

Five cases of optic atrophy (two accompanied by diplopia) were treated by salvarsanized serum injected into the cerebro-spinal fluid. One case alone responded favourably. Knapp suggests that the intravenous method of giving salvarsan should first be adopted, its effects being controlled by repeated examinations of the cerebro-spinal fluid. If the abnormal conditions in the fluid are not corrected by the intravenous injections, salvarsan should be given intraspinally until the fluid becomes and remains normal. When administered by the spinal route, it is probable that the remedy reaches the peripheral parts of the optic nerves.

The author regards the treatment of tabetic atrophy as a preventive one. When patients with atrophy consult the ophthalmic surgeon, it is probably too late for effective interference. On the other hand, a better field is found when, although the pupil or the ocular muscles are affected, the optic nerve yet remains free from morbid changes. Under those circumstances, the cerebro-spinal fluid should be examined, and steps be taken to correct any abnormality that may be found, in the hopes of preventing a future atrophy of the optic nerves.

Discussion.

James Bordley, junior, of Baltimore, made the observation that in 75 per cent. of the cases of supposed syphilitic eye lesions in which the blood Wassermann was negative, the spinal Wassermann was positive. His impression was that treatment by salvarsan was of doubtful value in interstitial keratitis. In a couple of cases of optic atrophy treated intra-spinally, central vision deteriorated, but in one of them, the visual fields showed distinct enlargement.

Koller, of New York, spoke of the danger of salvarsan when administered to those who presented no signs or symptoms of syphilis beyond a positive Wassermann reaction.

P. A. Callan, of New York, contrasted the unilateral character of keratitis, when due to the acquired disorder, with the invariable bilateral character of the disease, when due to inherited syphilis. He had seen disastrous results from the employment of salvarsan in affections of the optic nerve.

Marple, of New York, believes that the treatment of lesions of the optic nerve by salvarsan bids fair to change entirely the prognosis of those conditions, and quotes illustrative cases. At the same time enthusiasm for the newer remedies must not be allowed to blind us to the virtues of the old.

R. L. Randolph, of Baltimore, contrasted the brilliant result of treatment by salvarsan in keratitis due to acquired syphilis with the poor results obtained by him in the inherited cases.

Derby, of Boston, believes that we owe a duty to patients with interstitial keratitis beyond the mere treatment of their eyes, namely, to make it our business to see that each one of them is placed in competent hands for the treatment of the hereditary syphilis. Such a system has been in force in Boston during the last few years.

John R. Shannon, of New York, saw necrosis of the corneæ follow the treatment of interstitial keratitis by inunctions and an intravenous injection of salvarsan. He suggests that this may be an instance of the Herxheimer reaction. In the result R.V. 5/200, and L.V. no p.l.

E. Terry Smith, of Hartford, recounted his experence with sero-salvarsan and believes that dropped into the eye or injected beneath the conjunctiva, it does good in syphilitic conditions of the eye. It was sometimes employed alternatively with dustings of dionin.

T. B. Holloway, of Philadelphia, believed that good results may be obtained in interstitial keratitis by repeated injections of salvarsan.

Ziegler, of Philadelphia, has obtained good results from salvarsan in interstitial keratitis, but not always. He spoke very favourably of enesol, applied intra-venously.

Wilder, of Chicago, has had three cases where the average duration of keratitis was so distinctly abbreviated by the use of salvarsan that he was compelled to attribute it to the new method of treatment. He had obtained excellent results from the subconjunctival injection of salvarsanized serum in a very severe case of syphilitic irido-cyclitis.

de Schweinitz, of Philadelphia, believes that neosalvarsan shortens the duration of interstitial keratitis and lessens its activity.

SYDNEY STEPHENSON.

(8) **Harry,** of Rochdale, has employed a 2 per cent. to 10 per cent. solution of the British product "Melargen," stated to contain 8 per cent. of metallic silver, in numerous external infective diseases of the eye. He speaks highly of the new product. SYDNEY STEPHENSON.

(9) *Apropos* the recent recommendation of quinine hydrochloride as a dressing for infected wounds, **Sir John Tweedy,** of London, recalls the fact that many years ago he advocated the treatment of "true" diphtheritic ophthalmia by means of quinine sulphate. For some time now he has employed the sulphate and the hydrochloride salt indifferently, and has extended the method to all cases of infective and sloughing ulcers of the cornea, and to many, if not to all, forms of infective inflammation of the conjunctiva. SYDNEY STEPHENSON.

BOOK NOTICE.

Ministry of the Interior, Egypt. Department of Public Health. Third Annual Report on the Ophthalmic Section for the year 1914. By the DIRECTOR OF OPHTHALMIC HOSPITALS, Egypt. Published at the Government Press, Cairo, 1915. Price B. T. 10.

From the date of inception of their publication the reports on the Ophthalmic Section of the Department of Public Health of Egypt have been of considerable interest to surgeons. The present volume is no exception, and more than maintains the reputation of its predecessors. MacCallan works with the machinery of a powerful and wealthy Government behind him, but even these would be of little avail without the enthusiasm, the organising power, and the professional capacity which, as Director of Ophthalmic Hospitals, he has put into his work. Egypt and ophthalmic science have alike benefited, and both are his debtors. The land of the Pharaohs has been fortunate in the men who have directed its destinies from the isles of the West, and if this is true of statecraft and of military organisation, it has been no less true of the foundation and management of the ophthalmic hospitals. MacCallan has had the courage to think in large figures. He has foreseen what he wanted, has asked for it, and has known how to get it. Only those who have served governments in the far-flung spaces of the Empire, know the difficulties of carrying through a scheme under such conditions. A rare combination of firmness of purpose, clarity of insight, determination to succeed, and tact in management are essential for success. MacCallan has succeeded, and in succeeding has written the name of Egypt indelibly across the pages of ophthalmology. He has obtained money, trained men, founded hospitals, and relieved a vast amount of suffering.

The Report deals first with the number and with the different types of hospitals at work, not forgetting the provinces without hospital aid. It next takes up the staffs and their training, the school clinics, the cost of the work, the age of the patients, and the incidence of blindness. The difficulties introduced by the war and other kindred subjects are dealt with. Then MacCallan passes from the *rôle* of the successful administrator to that of the practical clinician. Every word he has to say under this heading is worthy of perusal by ophthalmologists. The number of new cases treated during the year has risen to 50,126, and the total attendance to 686,000, whilst 40,710 operations were performed. The last year and a half has accustomed us to thinking of large masses of men, but that one medical administrator should handle such figures as these is astonishing, when European practice is thought of.

Of cataract, he writes: "449 operations were performed for the removal of senile cataract. In these cases an iridectomy is always performed and the capsule of the lens is opened with capsule forceps. The number of cases of senile cataract seen was 1,159; the reason so few of them were operated on was that in many cases the condition was complicated by glaucoma, opacity of the cornea, or active trachoma.

"One hundred and ninety-two cases of soft cataract were seen, most of which were operated upon. It is noteworthy that only six of these, or 3 per cent., were of the lamellar variety, the remainder being generally associated with anæmia, the result of ankylostomiasis."

He reverts once again to the operative treatment of glaucoma. During the past year, a diagnosis of glaucoma was made in 1,761 cases, and in no less than 1,147 of these the disease was "absolute." Four hundred and fifty-three operations for glaucoma were performed, of which only 25 were iridectomies, and the remaining 428 were trephinings with iridectomy. The latter operation has "almost entirely superseded" the former in Egypt. The figures illustrative of its growth in popularity are given for the years 1911 to 1914, and are as follows—14, 152, 317, and 428. Only one case of late infection has yet been seen in Egypt out of 911 operations with the trephine, "in spite of the fact that every effort is made to see the result of the operations." The notes of this case are given. It occurred in a boy of 10 years of age, who had been operated on thirteen months previously; *four days before he came to hospital he had been struck on the eye with a stick;* so it may certainly be questioned whether it can fairly be included in the category of late infections. *A propos* this one case, MacCallan remarks "the danger of inflammatory changes in the eyeball, the result of local weakening due to the presence of the trephine hole, is not very real, at any rate in Egypt." This evidence is the more important, as coming from the land, which not only has the unenviable reputation of standing first in the world in the prevalence of acute conjunctival infection amongst the people, but which demonstrates the malignant nature of these infections, in the fact that the gonococcus takes pride of place in the results of bacteriological examination of conjunctival smears from inflammatory cases.

MacCallan and his surgeons are amongst those who have followed the reviewer's recommendation, namely, that, in Eastern countries at least, the second eye should be trephined for prophylactic purposes. His views on this subject have not changed, for he says, "The frequence of the disease, and the knowledge that at some time or another the disease, if present, manifests itself in both eyes, makes me advise the performance of a prophylactic operation in the unaffected eye, immediately the diagnosis of primary glaucoma has been made in the other." One of the features of results obtained with the trephine has been the extraordinary difference in those obtained by different surgeons, not merely as to immediate results, but still more in the incidence of late infections. The excellent results of the Egyptian hospitals is probably, in part at least, to be explained by a sentence in the report which must be very gratifying to MacCallan's staff, *viz.*: "The enormous amount of experience which the surgeons obtain renders the operative ability of the senior surgeons of a very high order."

In view of the extraordinary prevalence of conjunctivitis in Egypt, MacCallan's remarks under this heading are of great interest.

"Acute ophthalmias.—The satisfactory classification of conjunctivitis prevents a great deal of inaccurate diagnosis and loose thinking. That which I recommend depends on the bacteriological cause of the disease:—

I.—Gonococcus.

II.—Koch-Weeks bacillus.

III.—Morax-Axenfeld diplo-bacillus.

IV.—Other organisms: pneumococcus, streptococcus, Klebs-Löffler bacillus, etc.

"Each variety has an acute, a subacute, and a chronic form. Mixed infections are very frequent. Such a diagnosis as "muco-purulent conjunctivitis" should no longer be made, as it is merely a description of the subacute form of any variety of conjunctival inflammation.

"The diagnosis of the bacteriological cause of acute ophthalmias is made by microscopical examination. During the past year 7,784 such examinations were made."

An analysis of these results is given, showing gonococcus in 43·6 per cent., Koch-Weeks' bacillus in 19·5 per cent., Morax-Axenfeld bacillus in 16·6 per cent, and so on. These results are compared with those obtained by laboratory work in which the figures for the same three organisms stand respectively at 47·2, 33·0, and 19·6 per cent. A comparison with Meyerhof's tables is also made.

Relation of the gonococcus to temperature variations, etc.—MacCallan discusses the incidence of gonococcal infection from month to month throughout the year, and concludes "that temperature alone influences the incidence of gonococcal conjunctivitis, and this effect is manifested a month after the temperature variation."

On the relation of the bacillus of Koch-Weeks and of the diplo-bacillus of Morax-Axenfeld to temperature variations.—"The bacillus of Koch-Weeks begins to show activity in February, immediately the temperature rises above the comparative cold of January. This activity goes on steadily increasing until June, when the maximum temperature is reached. Both temperature and conjunctivitis show a simultaneous fall in July. This fall is continued in the case of conjunctivitis but reversed as regards the temperature in August. An unexplained increase of conjunctivitis occurs in September, although by this time the autumnal fall of temperature has begun. In October, November, and December the curves of the temperature and of the conjunctivitis exhibit a simultaneous downward trend."

As to the difference in the reaction of organisms of acute conjunctivitis to temperature variations, we learn that, from a consideration of the observations recorded, the Koch-Weeks and the Morax-Axenfeld organisms appear to react at once to temperature variations, whilst the gonococcus requires a month to show a reaction.

The treatment in vogue for acute ophthalmia in Egypt is given in detail. It has been specially adapted to the needs of the people.

MacCallan's remarks on trachoma are of considerable interest, for his experience of this disease must be almost, if not quite, unrivalled. He has somewhat modified his early classification of the stages of this affection. No apology is needed for quoting him *verbatim*. He writes :—

Trachoma.—Without a classification of trachoma it is impossible for the student to form any intelligent appreciation of the phases of the disease. The classification* which I have introduced has been in use at the Egyptian ophthalmic hospitals since 1905. It is herewith shortly outlined :—

Trachoma, stage I. Seen typically soon after infection has taken place as slight roughnesses forming greyish dots

Trachoma, stage II is divided into (*a*), (*b*), (*c*) :—

Trachoma, stage II (*a*). Greyish follicles project above the surface of the conjunctiva which rupture on pressure, allowing the escape of gelatinous material.

Trachoma, stage II (*b*). Raspberry-like papillæ mask the typical follicles. Two subvarieties may be distinguished, II (*b'*) which is unmixed trachoma, and II (*b''*) which is trachoma complicated by spring catarrh.

Trachoma, stage II (*c*). Trachoma complicated by gonococcal conjunctivitis.

Trachoma, stage III. In which cicatrization is beginning.

Trachoma, stage IV. In which cicatrization is complete.

There are many cases which cannot be stated to belong to a definite stage ; for instance a case may be between stage II and stage III, but for purposes of teaching and treatment the division into stages has been found to be very useful.

The treatment of the various stages of trachoma may be roughly summarized as follows:—

Trachoma, stage I. Silver nitrate, two per cent, copper sulphate stick.

Trachoma, stage II (*a*). Mechanical rupture of the follicles with Graddy's forceps, squeezing, scraping; perchloride of mercury solution, one per cent.

Trachoma, stage II (*b'*). Mechanical scraping with a sharp spoon; perchloride of mercury solution one per cent.

Trachoma, stage II (*b''*). Heisrath's combined excision of tarsus and conjunctiva.

Trachoma, stage II (*c*). Silver nitrate, two per cent.

Trachoma, stage III. Copper sulphate stick. When spots of post-trachomatous degeneration occur they should be evacuated by opening with the point of a knife."

The Report deals with the extension of the system of inspection of schools and of infant schools, and shows that the treatment of trachoma has been vigorously carried right into the heart of these institutions. The figures in this section are remarkable. We read: Trachoma.—The number of pupils affected by trachoma is now 92 per cent. The more infective stages of the disease, which in 1907 amounted to 95·5 per cent., amounted at the beginning of the school session this year to 11·7 per cent., and were reduced by the end of the session to 0·27 per cent. In spite of the fact that there is some deterioration of the conjunctival condition during the summer vacation, when the pupils receive no compulsory treatment, the permanent progress is decided.

"This year 24 per cent. of the first year's pupils presented themselves with the more contagious stages of trachoma, as compared with 55 per cent. last year. I am unable to give any definite reason for this diminution. At the end of the school year these cases had been reduced from 24 per cent. to under 1 per cent."

If these claims can be made good (and we do not doubt it), then MacCallan and his staff are making history and deserve well of Egypt for this work alone.

In studying the statistics of blindness put before us, the predominant feature of the tables is the overwhelming influence of conjunctival inflammations. Though this factor distorts the results in such a way as to make one think at first sight that they can throw but little light on European figures, the tables are not without an interest of their own, and are, therefore, commended to the attention of the reader. The large amount of secondary glaucoma attributed to conjunctival trouble, and the extraordinary frequency of corneal opacity and of shrunken globe, are features of more than passing interest.

The war has acted adversely on the "ophthalmic policy" of the Government, but we learn that all existing ophthalmic work will be maintained. In view of the nature of the work, this is a cause for congratulation.

R. H. ELLIOT.

CORRESPONDENCE.

While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

GLASS WORKERS' CATARACT.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—In the very interesting paper on Glass Workers' Cataract in your November number, Dr. William Robinson quotes Colonel Elliot as saying that in cataract in India "the form of opacity is of the ordinary senile type, and does not begin in the posterior cortex of the lens." By "senile" I take it he means cataract usually found beginning in the cortex in Europe.

In this part of India, and in others I have served in, this is not the case. It is quite rare to see a cataract beginning in the cortex of the lens, the vast majority begin in the nucleus, a few are found more generally diffused throughout the lens from the beginning, and only a minute percentage are cortical at the start. The nuclear forms are generally deeply situated, although not always enough so to be called posterior cortical. This statement is based on examinations made under a mydriatic, of course.

This prevalence of nuclear cataract has always seemed to me to point to an excess of heat and light rays (we get both in excess), as being one of the factors in the causation of cataract.

An interesting and instructive contribution on this point would be derived from statistics showing the relative proportion of cataracts beginning as cortical or nuclear in Europeans in India and at home. I have not enough figures to make this point clear, but my impression is that although cortical cataract is more commonly seen in Europeans in India than it is in Indians, yet it does not preponderate over nuclear forms, as it does in Europe. In other words, I believe that whereas Europeans in Europe usually get cortical forms of senile cataract, after long residence in the tropics they more frequently get nuclear forms.

If proved true, this would support Dr. Robinson's conclusions as to the influence of heat on cataract formation.

I am, sir, yours, etc.,
F. P. MAYNARD,
Lt.-Col., I.M.S.

CALCUTTA,
Dec. 6th, 1915.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—I thank you for so kindly sending me an advance copy of Colonel Maynard's letter. I do not think that there is any wide divergence of opinion between us.

Dr. Robinson's premises with regard to glass-blowers' cataract were (i.) that it *begins in the cortex* of the lens posteriorly ; (ii.) that it *spreads in the posterior cortex*, to assume a characteristic form and appearace ; and (iii.) that it later spreads to the whole cortex ; and (iv.) that it *never begins in or around the nucleus*.

His questions to me were (1) Is this true of the senile cataract as met with in India? and (2) How is the great frequency of cataract in India to be explained?

My answer to the first question was that though I am familiar with such cataracts as Dr. Robinson describes, they are comparatively of very rare occurrence, and that the ordinary senile cataract met with in India, is certainly not of the type above described. As to the second question, I told him I was not satisfied that the apparent commonness of cataract in India, is not due, in part at least, and possibly in great part, to the comparative paucity of ophthalmic surgeons, as compared with the enormous population.

With regard to my first point, Colonel Maynard would appear to be in agreement with me, for he holds it a *rare event to find a cataract beginning in the cortex* at all, and a *common thing to find it beginning in the nucleus*. We are, therefore, I think, in agreement on the main point raised by Dr. Robinson.

I am also in agreement with much of what Col. Maynard says about the peculiarities of the senile cataract in India, and Herbert's book shows he takes the same line. I have, however very frequently seen cortical striæ, sectors, dots, etc., constituting the earliest evidence of senile cataract in Madras. This subject is, however, far too large to be dealt with in a correspondence column.

In conclusion, I should like to suggest, that even if the interesting experiment in statistics, which Col. Maynard suggests, were undertaken and turned out as he thinks likely it will, we shall still have to consider the possibility of other factors besides that of the direct action of light and heat on the eye. I need not name such factors to Col. Maynard, as they are well known to him, but for those of your readers who do not know Eastern conditions, I should like to mention two of them, *viz.*, the influence of diet, and that of prolonged heat on the body as a whole; with its tendencies to anticipate senility. These are admittedly speculations, and not new ones at that. To throw any real light on the subject, a very exhaustive enquiry would be necessary. The mere expression of opinions will carry us but a little way, and I therefore put the above suggestions forward with due diffidence.

Yours truly,

R. H. ELLIOT,

January 8th, 1910. Lt.-Col., I.M.S., Retd.

THE ÆTIOLOGY OF GLAUCOMA.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—I beg leave once more to correct Colonel Elliot, who, in his communication appearing in the current number of THE OPHTHALMOSCOPE, criticises my views on the ætiology of glaucoma, on the assumption that sclerosis of the cribriform ligament is the only factor that I had brought forward.

As a matter of fact, if he will only refer to my work, quoted in his paper, he will find that I have throughout insisted on two factors. The first, constant and predisposing cause lies in the *pathological* excess of the physiological sclerosis of the cribriform ligament. The second, variable and exciting cause is vascular.

The physiological basis of increased pressure within the eye lies in the fact that the normal intra-ocular pressure is the same as the venous pressure at the point of venous exit in the eye, *e.g.*, central retinal veins, venæ vorticosæ, and the venous sinus of Schlemm's canal. I submit that I am entitled to claim this as a fact, as being open to clinical proof—which is more than can be put forward on behalf of the view that the intra-ocular pressure is a matter of volume. Nevertheless, in his recent communications Colonel Elliot totally ignores this fact.

So long as the aqueous comes into direct contact with the venous sinus of Schlemm's canal, the intra-ocular circulation is analogous to that in elastic tubes. As the access of aqueous to Schlemm's canal becomes impeded, the intra-ocular circulation, flowing as it does between the sclera, on the one hand, and the incompressible fluid contents (aqueous and vitreous), on the other, tends to become converted from an elastic to a rigid system of tubes. It is on this account that the intra-ocular pressure is raised and maintained at a higher level.

From reading the article, readers of THE OPHTHALMOSCOPE might well be led to believe that I had never discussed the physiology of the intra-ocular pressure, or brought forward any explanation whatever for the presence of the shallow anterior chamber in glaucoma, and the pathological findings of adhesion of the iris root. Yet in my work, cited by Colonel Elliot himself, I have dwelt fully on all these points.

Both these latter conditions are, I maintain, manifestations of congestive œdema following upon the altered nature of the intra-ocular circulation already referred to.

Swelling of the choroid pushes the vitreous and lens forward, while similar œdema of the iris results in first the application, and finally the adhesion of the iris root to the circumference of the cornea.

It is one thing to disagree with these views; it is quite another for Colonel Elliot or Mr. Priestley Smith to state that I do not account for them.

I am, Sir, yours,

THOMSON HENDERSON.

OFFICERS' QUARTERS,
NETLEY, HANTS.
10*th January*, 1916.

NOTES AND ECHOES.

Deaths.

WE regret to announce the death of C. Fred. Pollock, which took place recently at Dumfries, at the age of 71 years. Dr. Pollock was educated at Glasgow, Tübingen, and Vienna. He graduated M.D. of Glasgow University in 1882, and became F.R.C.S.Edin. in 1884. He was at one time Ophthalmic Surgeon to the Royal Hospital for Sick Children, Glasgow, as well as Surgeon for Diseases of the Eye at the Glasgow Central Dispensary. In 1886 he published a text book, "Normal and Pathological Histology of the Human Eye and Eyelids," extremely well illustrated both in black and white and in colours from his own drawings. Shortly after he published a treatise on "Leprosy as a Cause of Blindness."

The death is announced of Edward Sprague Peck, aged 68 years. His practice lay in New York City. Dr. Peck had pursued his studies in eye, nose, and throat work at the Universities of Berlin, Erlangen, Bavaria, Zurich, Vienna, and Paris, and he passed the winter of 1877-1878 attending the work of the Moorfields and the Middlesex Hospitals. He was attached to the staff of the *New York Medical Record* for upwards of 20 years. He is survived by his wife and four children, to whom we extend our condolence and sympathy.

From New York the death is announced, at the age of 79 years, of Homer G. Newton, one of the founders of the Brooklyn Eye and Ear Hospital.

Professor Ulrich, for many years *Dozent der Augenheilkunde* in Strassburg, known for his researches upon the interchange of fluid in the eye, died on November 10th, aged 67 years.

From Bordeaux the death is announced of Antonio de Menacho, editor of the *Archivos de Oftalmologia Hispano-Americanos*, at the early age of twenty-five years. Dr. Menacho was working in Professor Lagrange's *clinique* upon the subject of military surgery. He had an expert knowledge of chemical analysis and of histology, normal and pathological. Menacho had made a special study of the eye in relation to comparative anatomy. He was distinguished as a fine speaker.

* * * *

Honours.

THE name of George Andreas Berry was included in the list of New Year's Honours, when the honour of Knighthood was conferred upon him. We need hardly remind readers of THE OPHTHALMOSCOPE that Sir G. A. Berry is honorary surgeon-oculist to H.M. the King in Scotland, consulting ophthalmic surgeon to Edinburgh Royal Infirmary, ophthalmic surgeon to the 2nd Scottish General Military Hospital, and ex-President of the Royal College of Surgeons of Edinburgh and of the Ophthalmological Society of the United Kingdom. Best congratulations to our distinguished colleague.

We are glad to see that Colonel William Tindall Lister, consulting ophthalmic surgeon to the Expeditionary Forces in France, has been created an additional member of the Most Distinguished Order of Saint Michael and Saint George (C.M.G.), for services rendered in connection with military operations in the Field, to be dated the 1st January, 1916.

* * * *

Appointments.

MR. R. AFFLECK GREEVES has been appointed assistant surgeon to the Royal London Ophthalmic Hospital (Moorfields).

Mr. Nathaniel Bishop Harman has been appointed ophthalmic surgeon to the West End Hospital for Diseases of the Nervous System.

Dr. Gourfein has been appointed professor of Clinical Ophthalmology in the University of Geneva.

* * * *

Wood Alcohol.

WITH the view of lessening the number of cases of blindness from wood alcohol, the United States has forbidden its use in preparations for internal or external employment.—*Canada Lancet*, December, 1915.

* * * *

Ophthalmological Society of the United Kingdom.

As already announced in THE OPHTHALMOSCOPE DIARY, the next Annual Congress of the Ophthalmological Society will be held on Thursday, Friday, and Saturday, the 4th, 5th, and 6th, of June, 1916. The Clinical Meeting will be held at 3 o'clock on May 5th at the Central London Ophthalmic Hospital, Judd Street, W.C. The other meetings will be held at the Rooms of the Royal Society of Medicine, 1, Wimpole Street, London, W. There will be two discussions, the first on May 4th to be opened by Mr. Herbert Parsons and Mr. A. L. Whitehead on "Foreign Bodies in the Eye and Orbit, with Especial Reference to Prognosis and Treatment," the second on May 5th, to be opened by Mr. J. B. Lawford and Mr. S. Browning on "The Treatment of Syphilitic Eye Affections by the Newer Methods." It is proposed to hold a museum of drawings, pathological specimens, etc., during the Congress. Members wishing to exhibit should communicate with Stephen Mayou, 30, Cavendish Square, W. Members desirous of reading papers, showing cases, or taking part in the discussions, are requested to communicate with Mr. Elmore Brewerton, 84, Wimpole Street, London, W.

* * * *

British Optical Association.

FROM a circular recently issued by the Secretary we learn that the British Optical Association is authorised by the Army Council to superintend a scheme for the supply of spectacles and ophthalmic appliances to the Army, and for the employment for the duration of the war of: (*a*) A voluntary staff of opticians for part Home service;.(*b*) A permanent staff of opticians for Home and Foreign service.

THE OPHTHALMOSCOPE DIARY.

	1916.	
Midland Ophthalmological Society.	February 1st.	Midland Eye Hospital, Birmingham.
Royal Society of Medicine: Section on Ophthalmology	Feb. 2nd	1, Wimpole Street, W.
Midland Ophthalmological Society.	April 4th	Midland Eye Hospital, Birmingham.
Ophthalmological Society of the United Kingdom.	May 4th, 5th, & 6th	London.
American Ophthalmological Society.	May 9th & 10th	Washington, D.C.
Midland Ophthalmological Society.	June 6th	Eye Hospital, Cheltenham.
Royal Society of Medicine: Section on Ophthalmology	June 14th	1, Wimpole Street W.
Oxford Ophthalmological Congress.	July 13th & 14th	Keble College, Oxford.

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A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

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ORIGINAL COMMUNICATIONS.

ON SUPERFICIAL LINEAR KERATITIS, TOGETHER WITH AN ACCOUNT OF THE PATHOLOGICAL EXAMINATION OF TWO AFFECTED EYES.*

BY

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Introduction.

THIS is, so far as my experience goes, a rare condition; but inasmuch as it presents appearances which have been remarkably uniform in all the examples which have come under my personal observation, it must be regarded as a clinical entity. I have had the opportunity of getting two specimens of whole eyes for microscopic examination, and I thought it would interest the Section to hear the clinical report and pathological examination together. This latter has been done for me by Mr. R. A. Greeves

It is possible to divide the cases at once into two groups: in the first group are the simple cases, which get well speedily and do not recur; in the second group the clinical features are identical with those of the first group, and they make the same recovery to a great extent, but are followed by a series of relapses, resembling those of relapsing bullous keratitis, going on for months, and years (in one of my cases for sixteen years), and leading to great damage to the eye and even loss of sight.

Clinical Characters.

The clinical features are sudden onset with pain and congestion in an eye, the appearance of a number of superficial ridges of epithelium in the cornea raised from the general level of the corneal surface, for the most part vertical in arrangement, grey in colour with tapering ends, not reaching to the limbus. Under magnification, the ridges are double contoured with a comparatively clear centre; they are denser and thicker in places, giving an appearance of nodes at more or less regular intervals. As a rule, the ridge does not stain with fluorescein as a whole, but punctate staining along its course is common, especially over the nodes.

The affected eye is, as a rule, very slightly or moderately congested. No iritis and no corneal precipitates are present.

One remarkable feature, which is almost always present during at least some portion of the attack, is a softening of the eye, so that tension falls to −1 and often to −2; during this time of diminished tension, the vision is greatly impaired, and in one case it dropped to 2/60. The attack itself lasts from a few days to a week or longer, and as the ridge disappears, the vision recovers and the tension becomes normal again; sometimes the diminution in tension lasts only a few hours. The only condition left behind after each attack is a slight greyness or visibility of the corneal epithelium along the track; if the attack does not recur, this greyness passes, but where a succession of attacks goes on for months, a permanent greyness is established, which in the worst cases makes the corneal surface opaque.

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* [illegible] 2nd, 1916, before the Section of Ophthalmology, Royal Society of Medicine.

Pain varies, but in the worst cases is considerable, especially with the diminished tension, and the patient becomes much worn and exhausted with the pain and worry of the eye. There is no anæsthesia of the cornea.

It is mostly young adults who are affected. It cannot be said that they are remarkable in any way, but the worst cases impress one as being poorly nourished and thin, and as their general nutrition improves, the state of the eye improves also. On the other hand, part of their general poorness of condition is due to the wearing nature of the eye trouble.

Treatment.

I cannot say that anything has been found of real or permanent value. The immediate attacks yield to ordinary treatment on general lines, but the recurrences are not prevented by anything I have used myself or seen used by others.

Among the measures that have been used are heat in various forms, antiseptic lotions, aristol, pyridine, atropine, eserine, dionine, and massage with mercurial ointment, and absolute phenol and absolute alcohol applied to the cornea, and peritomy, iridectomy, radium emanations from Bath water, radium ionizations, change of air, Switzerland.

Nature and Affinities.

The disease is clearly epithelial with an underlying neuropathic element, as evidenced by the diminished tension.

In anatomical situation it has something in common with superficial punctate keratitis, in which the points are analogous to the nodes in the cases under consideration, but the resemblance goes no farther. Its appearance is somewhat like that of the dendritic ulcer, but the lines are multiple, are much narrower and straighter in their course, and do not possess the bud-like outgrowths from the central stem. It also differs in its greater resistance to treatment, and in its persistent recurrences; moreover, the dendritic ulcer is not commonly accompanied by great lowering of tension.

In many respects it is like the recurrent bullous keratitis or relapsing abrasion; but it is not always the result of an injury, and its linear form as well as its peculiarity in regard to ocular tension clearly separate it from this disease.

It is most probable that diminished tension is the essential feature, and that the lines are produced by a kind of crumpling or folding of the relaxed Bowman membrane. This view of it was first suggested by the behaviour of one of the earlier cases that I saw, in which an injury to the cornea, treated by a compress, was followed by the appearance of lines. The lines seemed to be the result of pressure, as the disappeared soon after the compress was left off. But the lines appear without any pressure being applied at all.

In favour of the neuropathic element one at least of my cases complains of the eye feeling numb, as if it were asleep, when the attacks are coming on, although there is no loss of sensation. The diminished tension points either to a toxic action on the secreting epithelium of the ciliary body, or to a reduction of secreting activity from altered innervation to the internal secreting areas of the eye.

The evidence of toxic absorption is not present, as neither iritis nor cyclitis, that is, corneal precipitates, are ever seen during the course of the disease.

Nomenclature.

I have preferred to make the name as far as possible descriptive. The affection is inflammatory, it is linear, and it is superficial. The terms *reticular* or *lattice* or *trellis keratitis* have been applied to other affections of the cornea, clearly not of an inflammatory or acute nature.

I have looked through the references to similar affections, and the only case I have come across corresponding at all with my own is one by L. Caspar in the *Klinische Monatsblätter für Augenheilkunde* for 1903 (p. 289), in which a week after an injury a number of superficial lines appeared in the centre of the cornea not connected with the injured spot, with knob-like thickenings which stained; the lines disappeared and left no mark. Caspar considered the cause to lie in a flattening and distortion of the cornea, giving rise to the formation of longitudinal grooves.

Cases.

1. *Superficial linear keratitis proceeding to loss of one eye and subsequent involvement of the other.*

Clara Harris, aged 33 years.—*December 28th*, 1901.—The left eye began to be troublesome at 18 years of age; she had attacks at intervals of three or four months at that time, but they became less frequent after. The last attack before the present one was four years ago. She was then treated at the Oxford Eye Hospital as a case of dendritic ulcer. Her general health was fairly good. Urine, 1024, acid, no alb., no sugar. Was rather thin, but took her food well, and had no indigestion.

$$\text{V.}\left\{\begin{array}{l}\text{R. } 6/12 + 2\ \ 6/6 \\ \text{L. } 6/60 \text{ not impd.}\end{array}\right. \qquad \text{V. Fields full. T.n.}$$

There is moderate ciliary congestion; a general superficial haziness of the cornea with blurring of details of deeper parts. The pupil dilated fully with atropine. Details of left fundus not well seen, but nothing abnormal remarked. The lenses are clear. There is no staining with fluorescein. On examining the cornea fully, a number of grey lines can be seen running, generally in a vertical direction; the lines are raised above the surface into a very distinct ridge, so that in some places the impression given is that of an elongated vesicle or of a chain of vesicles. The whole appearance suggests a surface affection, and the lines are apparently made up of epithelium only; where the vesicular appearance is not marked, the lines appear double contoured, that is, of tubular structure. Between these clearer parts are certain nodules denser than the rest of the lines. Besides these broad superficial lines with raised surface, the rest of the cornea is covered with very delicate grey lines running in the same direction as the broad ones, that is, vertically; in places these merge into the broad lines or disappear behind them; all the lines taper off to nothing at the upper and lower periphery. The faint lines suggest that they are old tracks which have healed. Patient discharged on February 4th, 1902.

October 27th, 1902.—Was re-admitted with the eye in the same condition. She was treated locally by hot applications and by atropine; later, by eserine, without effecting any marked improvement.

December 24th.—Iridectomy upwards was made; no benefit resulted. T.n.

January 17th, 1903.—The sclerotic was cauterized all round just outside the limbus. This resulted in an improvement of the symptoms, the irritation, photophobia, and weeping being a good deal lessened; but there was not much effect on the corneal condition at once, although the vision improved to $\frac{6}{18}$.

April 27th.—A relapse. No staining of cornea, which was painted with phenol.

February 10th, 1904.—Recurrence three weeks ago; there has been great pain. The congestion is very great, the cornea rough and covered with vertical lines (Fig. 1). Anterior chamber shallow. Iridectomy coloboma up; pillars of iris free.

February 18th.—It was decided to remove the eye, since there was no prospect of cure, and the patient's life was being made useless and irksome.

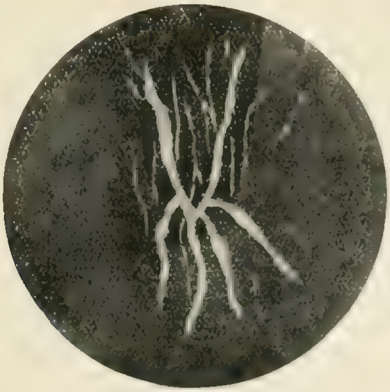

FIG. 1.—Clara Harris, 33 years.

Drawing made February 10th, 1904.
Iridectomy coloboma up.
Raised, vertically running lines, in places double contoured, with thicker parts at intervals.
Also fainter lines, vertical in direction, all over the cornea.

October 25th, 1904.—The patient was re-admitted, as the right eye had been getting dim for a month, and she had been having much headache in the frontal region. R.E.—lid swollen; general haze of cornea with dense striated opacities and nodes; the lines suggest double contours, and the nodes are whiter and broader than the rest of the lines (Fig. 2). Sensation rather dull;

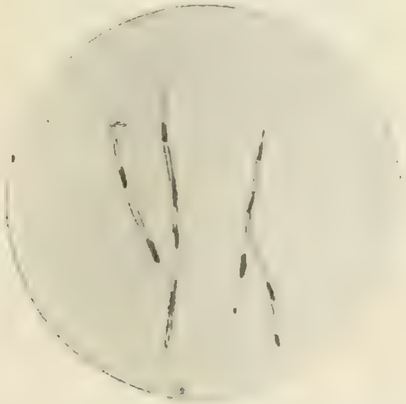

FIG. 2.—Clara Harris. Second eye.
Raised lines grey, double contoured, with nodules in places of greater density but not of greater thickness.

anterior chamber normal. Pupil 3/4 dilated. Iris bright. $V. = \frac{\text{Sph.} + 2}{\text{Cyl.} + 1\cdot5}$ 6/12.

November 22nd, 1904.—Discharged. No further account of the patien

2. *Superficial linear keratitis with loss of one eye and subsequent involvement of the second eye.*

Miss D. T. S. was sent to me by Dr. J. Burdon-Cooper on May 13th, 1914. She was under the care of Dr. Wilson Smith, of Bath.

The left eye had begun to trouble her in October, 1913. It began as faint grey lines, having a generally vertical direction, at first without any other ocular disturbance and with little congestion. The tension was much reduced. The treatment she had at various times was: antiseptic lotions, drops, and ointments; atropine, aristol, pyridine, applications of absolute alcohol massage. Nothing was of use. The eye became very painful, lost all useful sight, and was affecting her general health. It was excised in April, 1914. The other eye had already begun. One character common to both eyes was marked reduction in tension.

May 13*th*, 1914.—When I saw her, there was moderate ciliary congestion, a painful, somewhat tender eye, with a very depressed state of mind and health, as she was apprehensive of losing her sole remaining eye. There were five or six vertically running sinuous grey lines near the surface of the cornea, with tapering ends, and accentuated edges almost forming double contours. At intervals along the lines there were nodes broader and whiter than the lines generally; the surface epithelium was distinctly raised into a ridge over the lines (Fig. 3); no precipitates; no other corneal changes; no iritis. T – 1.

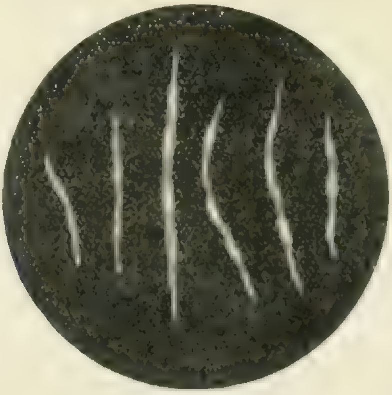

Fig. 3.—Miss D. T. S.

May 13th, 1914.—Six vertically running white lines near the surface of the cornea, not very straight, tapering at their ends, with a double contour and with dense broad nodes at intervals: the surface is raised into ridges over the lines.

About a week after the patient left, she began to have radium emanations from Bath water, the gas being passed over the eye through an eye cup with an entrance and exit. The gas came from a cylinder filled with the emanations taken from the surface of the water. From this time there was rapid recovery, but she thinks the eye had begun to improve before she had the gas, as she had been able to see a gas globe against a white curtain, and she had not been able to see any forms before. She was also fed up as much as possible, and took half a pint of cream daily, among other things.

July 3*rd*, 1914.—On this date there was no congestion, the corneal surface was quite smooth, there was no opacity, and the lines had gone ; there were no keratitic deposits ; no iritis. The T. was normal. V.R. $\frac{+0{\cdot}75}{+0{\cdot}5} = \frac{6}{6}$

November 12th, 1915.—In reply to my enquiries, I heard from Dr. Wilson Smith, of Bath, who reported : "She continued to make progress to complete cure and remained well for some months ; she got caught in Switzerland at the beginning of the war and had some difficulty in returning, and shortly afterwards her eye relapsed. I again tried radium emanation with slight improvement, but not cure. I substituted radium ionization for the last several months in the summer, I think with some slight benefit.

February 2nd, 1916.—On examination to-day I find the vision 6/36. Retinoscopy
+2
┼ +4, but no improvement in vision with any glass. There are now several superficial grey lines in the cornea with pronounced nodules all along them, and with a few punctate elevations of epithelium, but with no general raising of the surface. T. —1. Pupil dilates well. Fundus normal. She has no pain, but the eye feels quite numb, like a limb that has gone to sleep, when an attack is coming on.

3. *Recurrent attacks of superficial linear keratitis with recovery between the attacks*

Walter Cook, aged 17 years. Engaged in weighing cartridges at Woolwich.

January 28th, 1916.—This case came under Mr. J. H. Fisher's care at Moorfields ; I have to thank him for letting me use it. Three months ago, the patient felt a pricking in the left eye. At the Arsenal surgery he was told there was a piece of brass in the eye. It was removed, and the eye seemed all right after, and he returned to work ; two weeks after, it started pricking again, and he was given "drops" and returned to work. He has had about four attacks now, and his last attack is the worst he has experienced.

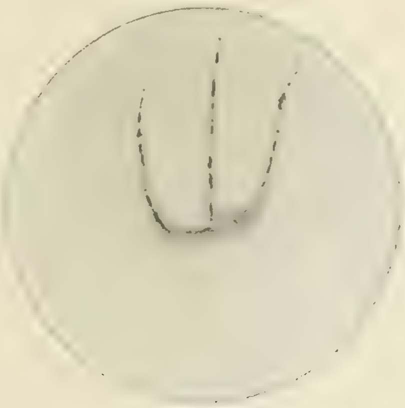

FIG. 4.—Walter Cook.

There is little or no fear of light, and but slight injection of the left eye, There is a faint grey trident-shaped opacity of the surface of the cornea, more dense at the lower part and showing a slight disturbance of the surface ;

at the lowest part, the base of the trident, the greyness extends over a considerable area. In the centre of each of the grey lines there is a small raised ridge of epithelium, not perfectly continuous, and not staining continuously with fluorescein. The whole appearance is as if there were a delicate mycelium growing or lying on the surface of the cornea; the lines, however, cannot be moved, and by careful examination, can be seen to be a breach in the epithelium. There is no appearance of nodules, but the breaks in the staining line show that certain parts of the lines are denser than others (Fig. 4). The tension of the eye is normal; there is no anæsthesia. The pupil dilates well.

4. *Superficial linear keratitis after a foreign body.*

June 23rd, 1905.—Albert Thorp, aged 16 years, came to St. Bartholomew's Hospital with a piece of steel embedded in the left cornea. It was removed by Mr. R. Foster Moore, who was then house surgeon Some atropine was used, and the eye was bandaged. Two days later, when I saw him, V. was reduced to 2/60, and the tension of the eye was − 1.

There were traces of the abrasion at about 7 o'clock, midway between centre and periphery, stained brown with rust, and not at all deep in the cornea. From this spot there were about four lines extending mainly up and in, across the cornea; they were epithelial ridges, and when the light caught them obliquely, they could be seen to be definitely raised above the general level of the cornea; looked at directly, they were grey in colour and opaque. The corneal epithelium generally was slightly œdematous.

June 29th.—Four days later, the lines had disappeared.

5. *Superficial linear keratitis. Recovery.*

William Asser, aged 16 years, lift boy. Seen at St. Bartholomew's Hospital.

Jan. 30th, 1913.—The right eye had been watering and "gummy" for two weeks; it had been red and painful; he had had no injury; was in good health; never had bad eyes before. V. R. 6/36 J.20 not improved. L. 6/6 J.1. T.n.

In the right eye are many vertical grey striæ, quite superficial, forming prominent ridges on the surface of the cornea reaching to the limbus above, and below ending in a crescent-shaped opacity, staining with fluorescein. Otherwise, cornea and iris are normal T.—2. He was taken into the Hospital, kept in bed, and treated with fomentations and atropine. In two days he was much better. A week later, on February 8th, 1913, the cornea had cleared, there was slight ciliary congestion, and a little roughness of the cornea below. His vision was 6/9.

6. Another case in a man was shown me by Mr. P. Flemming, under his care at Moorfields. No injury.

There were six vertically running ridges in the cornea with broken swollen surface, looking as if the eye had been scratched by a brush. At intervals there were nodes of greater density. His eye had been bad two weeks. With ordinary treatment, he made a good recovery.

7. Mr. J. Cole Marshall showed me the case of a boy under his care who had had a blow on the eye without a wound three weeks before.

There was moderate congestion, and four superficial gray lines raised above the surface of the cornea, with characteristic double contours and nodes. The tension was —1. He did not respond rapidly to treatment, and discontinued his attendance.

Pathological Examination.

Microscopical sections of the eye in the case of the patient Clara Harris, taken through the cornea at right angles to the direction of the linear opacities, show that the raised lines on the corneal surface are due to ridges

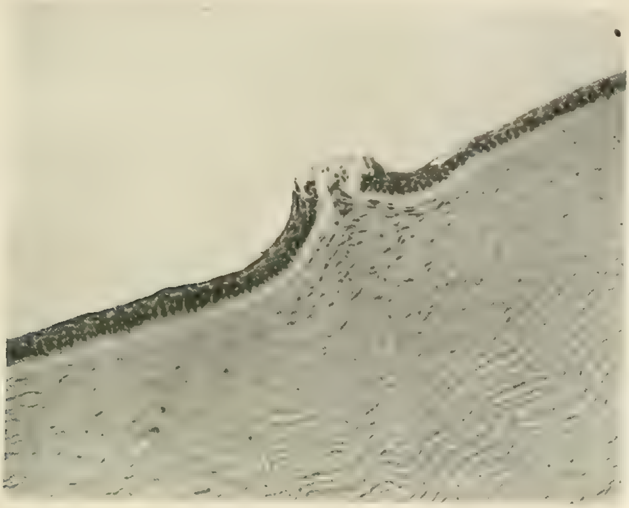

FIG. 5.

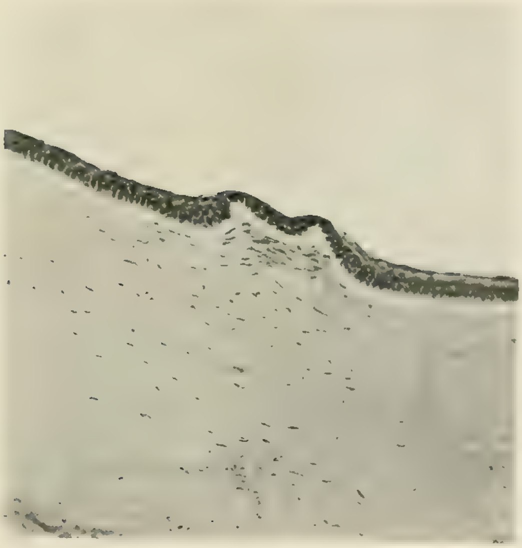

FIG. 6

in Bowman's membrane. These ridges vary in appearance in different places, but they are always characterised by the presence of new fibrous tissue in the immediately underlying *substantia propria.*

Some of the ridges are narrow and sharp, Bowman's membrane being raised up into a single well-marked fold (Fig. 5), while the majority are broader and show a double elevation (Fig. 6).

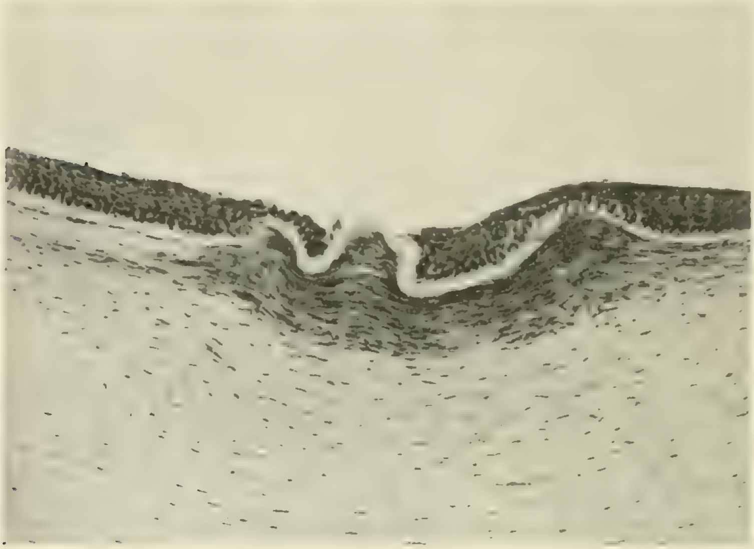

FIG. 7.

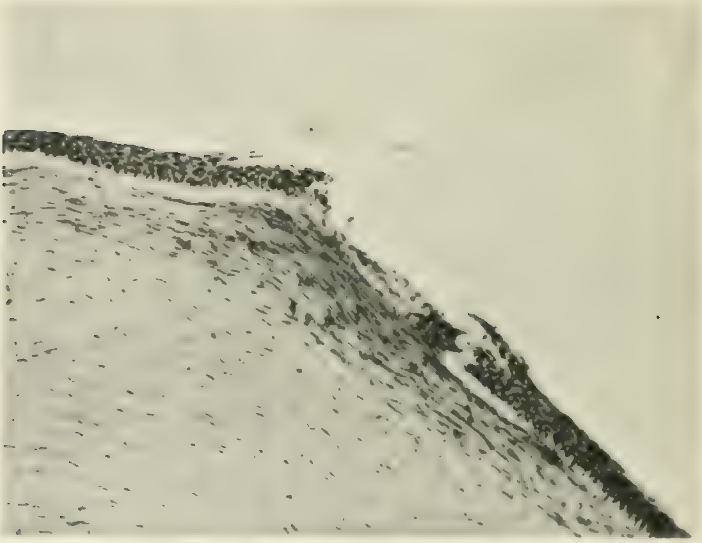

FIG. 8.

In some parts they broaden out into a series of ridges, with a strongly marked layer of underlying fibrous tissue (Fig. 7). In some of the latter, Bowman's membrane shows numerous bends and convolutions, and its continuity may be broken (Fig. 8).

Over most of the more raised elevations the epithelium is absent in the the sections, but this I believe to be an artefact, the epithelium having been rubbed off in the course of preparation.

In some sections a stripped off thin strand of epithelium can be seen still hanging on to the more normal epithelium at one side or the other of the prominence. These strands consist of one or two layers only of very much flattened epithelial cells.

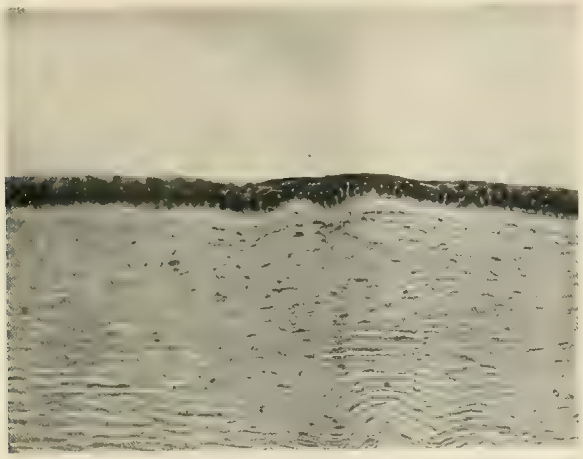

FIG. 9

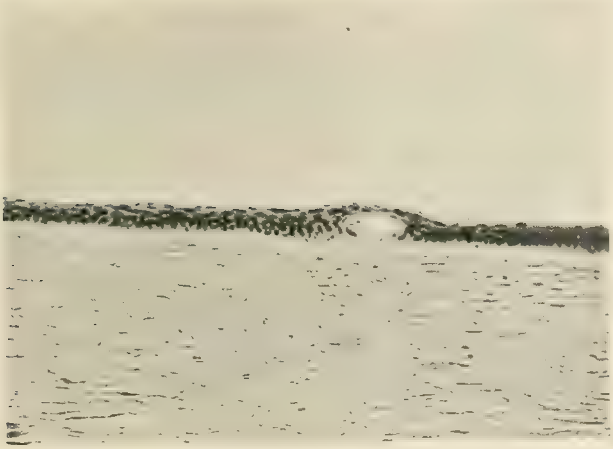

FIG. 10.

Some underlying fibrous tissue is always present, although it varies in amount. Fig. 9 shows the end of one of the double ridge lines—even here a small amount of fibrous tissue can be made out.

The fibrous tissue can only have been produced by the activity of the corneal corpuscles in the *substantia propria*, since in no case has vascularization of the patch been found.

A suggestion is that possibly the formation of fibrous tissue under Bowman's membrane precedes the wrinkling of the membrane, which may be caused by the contraction and increase in quantity of the tissue.

The epithelium over the rest of the cornea shows varying degrees of œdema. In some places bullæ are present, under some of which Bowman's membrane is unchanged (Fig. 10), while underneath others there are definite depressions in the membrane (Fig. 11). There is no evidence that the bullæ are precursors of the ridges; but this is, of course, a possibility.

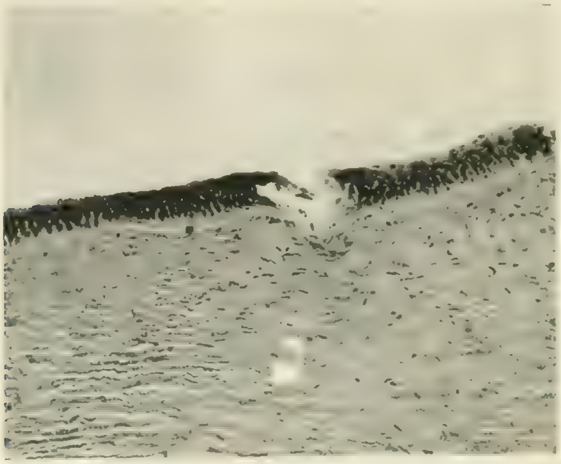

FIG. 11.

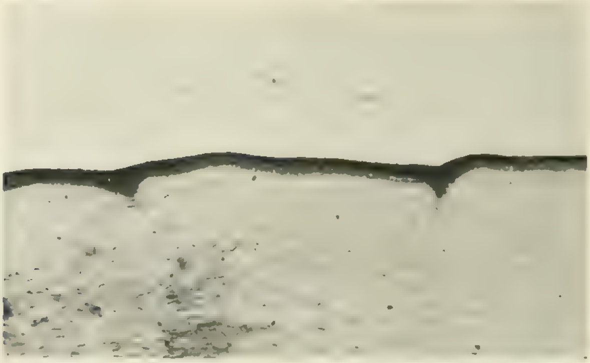

FIG. 12

The eye in the second case, in which enucleation was performed (Miss D. T. S., had undergone a good deal of drying before it was fixed, with the result that the staining of the cornea was unsatisfactory and that consequently good photographs could not be obtained.

Ridges in Bowman's membrane, with underlying fibrous tissue, could, however, be made out in the sections. No vascularization was present.

For the sake of comparison, I will show a section through a cornea, which was the seat of a fairly common variety of linear opacity, due to wrinkling but not to elevation of Bowman's membrane (Fig. 12). This form of linear opacity occurs in cases of perforation of the cornea, with resultant scarring, the clear residue of the cornea being the seat of the linear opacities. This section is taken from a case of that kind. The eyes, in which this kind of opacity occurs, are usually beginning to shrink, and have a lowered tension. It will be seen that the epithelium fills up the hollows in Bowman's membrane, and that the surface is almost, if not quite, level.

THE ÆTIOLOGY OF GLAUCOMA.

(*Continued.*)

BY

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In the two previous articles, we have discussed the pathological anatomy of glaucoma, and we are now in a position to investigate the ætiology of the disease.

In doing so, we shall take one by one the factors, which are usually accepted as causative of the disease, and study each in turn, bearing in mind throughout that a pathological access of ocular tension may be determined either by (*a*) an interference with the balance normally held between secretion and excretion in the eye, or (*b*) by an obstruction to the escape of blood from the eye, or (*c*) by a combination of these influences.

THE CAUSES OF GLAUCOMA.

(1) **Age.**—Age takes precedence over all known causes of this disease. Of this there can be no shadow of doubt. Priestley Smith's researches[1] settled the question nearly a quarter of a century ago; to quote his words—the frequency of glaucoma increases "slowly at first, more rapidly later in each decade, until about the sixtieth year. Between sixty and seventy, it is about as frequent as between fifty and sixty. After seventy its frequency. diminishes." It must be obvious, that the figures for the later decades of life cannot be rightly compared with those for the earlier in estimating the frequency of the disease, because for each succeeding decade, the number of persons living is rapidly contracting, until, after seventy, it is very small indeed. Moreover, the old are, for a variety of reasons, unable or unwilling to seek help to the same extent that younger people do.

Quite recently C. Haag[2] has analysed a series of 1,032 cases of primary glaucoma. He found that 4 occurred in the first decade of life, 16 in the second, 26 in the third, 74 in the fourth, 176 in the fifth, 288 in the sixth, 329 in the seventh, 116 in the eighth, and 3 later. He thus supplies a very interesting confirmation of Priestley Smith's work, which in its turn was founded on no less than 1,000 cases, scattered through the practice of a large number of surgeons. The fact that Haag's figures are from a single *clinique* and are serial, lends them an additional value.

It is one thing to decide that beyond any shadow of doubt, the advance of life stands in a strong causal relationship to glaucoma, but quite another to form in one's mind a clear and orderly conception of the inner meaning of this connection. In order to do so, we must pass in review all the possible factors of the case, and endeavour to attribute to each its share in the whole. It should, at the same time, be carefully remembered that our arguments must, in the absence of better data, be founded very largely on inferences drawn from clinical observation. This has been said before in the course of these papers ; it is repeated here, not with a view of casting doubt on the deductions arrived at, which the writer believes to be sane and well-founded, but in order that we should at no time lose a sense of the true position we occupy. If the conclusions arrived at are to carry conviction to others, it is obvious that they must be reached by simple, logical, and obvious processes of thought.

HOW DOES THE ADVANCE OF LIFE CAUSE GLAUCOMA?

That is the question we must now put, and the possible answers are so many, that it will be necessary to consider them under a number of headings and sub-headings.—

(A) Advancing age may act by bringing about **alterations in the anatomical conditions** of the parts, Amongst such we may class the following.—(*a*) enlargement of the lens ; (*b*) slackening of the zonule of the lens, allowing an advance of its anterior surface, or of its whole bulk, and (*c*) thickening of the fibres which constitute the pectinate ligament.

It is not only conceivable, but it is also probable, that each one of these factors is operative, to a greater or less extent, in most cases of glaucoma. They have already been discussed, and it is therefore unnecessary to deal with them any further now.

(B) Next to be considered is the **influence of degenerative changes**. Under this heading we include (*a*) an increase in the volume of fluid secreted by the eye, as a result of :—(i) nervous irritation of secretory fibres ; (ii) degeneration of glandular elements, or (iii) alterations in the vaso-motor conditions present ; and (*b*) an alteration in the nature of the secretion poured out by the ciliary body.

We shall take these in turn.

(*a*) An increase of secretion may be conceived to be the result of one or another of the factors enumerated, or of a combination of several factors. The view that an increase in the amount of fluid poured into the eye might bring about a pathological rise in tension, first saw the light in the days of v. Graefe and Donders. The former attributed the excess of fluid so produced to a serous choroiditis, whilst the latter was in favour of the theory, that an irritation of the secretory nerves of the eye was to blame. During the years which followed, many workers and writers took the same line. The bibliography has been excellently surveyed by Parsons. After a time these views fell into disrepute, and long remained so, under the influence of the overshadowing *rôle* accorded to the obstruction offered to excretion by the closure of the angle. Quite recently, however, there has appeared an inclination on the part of prominent ophthalmologists to reconsider this question. Priestley Smith[4] has spread the powerful ægis of his advocacy over the long discredited views of Donders in the following words :—"over-production of the intra-ocular fluid is at least a possible cause of chronic glaucoma—as suggested long ago by Donders." About the same time, Bjerrum[5] (1912) advanced the view that glaucoma arises from an inflammatory process, which especially affects the ciliary body, and so leads to hyper-secretion from that structure. Two years later Kuemmell[5a] gave utterance to almost identical views on this subject. Again, quite recently, Verhoeff, writing in connection with the question of the efficiency of the drainage of the eye after sclerostomy operations, raised the question of "the rate of total secretion against a given pressure," and said "it by no means necessarily follows, that because two glaucomatous eyes have equal intra-ocular pressures, their rates of secretion will be equal, especially against equal lower pressures." The above remarks of Verhoeff's are primarily directed to the question of the prognosis after operations for glaucoma, but they have a much greater interest, inasmuch as they show the recurrence of a tendency amongst our leading pathologists to lay stress on variations in secretory activity as a possible factor in the causation of glaucoma. The fact that ophthalmologists, so widely scattered as those whose names have been mentioned above, and each with so high a reputation in pathology, should have given utterance to the views that have been mentioned is in itself sufficient to make us seriously review the position; and, indeed, there would seem to be much in favour of the idea that excess of secretion may be not infrequently a factor, and sometimes a very powerful factor, in the causation of glaucoma.

Primâ facie, there would appear to be no reason why any one of the three factors we have mentioned should not be productive of an increase in secretion. Indeed, the analogy with other organs is all in favour of our hypothesis.

It may be argued that the secretory function of the ciliary body is still under dispute. This matter has already been discussed[7] in these pages. The conclusion arrived at, after a careful consideration of the arguments on both sides, has been that the production of the intra-ocular fluid is probably to be regarded as a combination of pressure filtration and active secretion. If this view be the correct one, and there is good reason to think it is, then it requires but a little stretch of the imagination to believe that nervous impulses, such as we know by direct experiment powerfully influence the salivary and other glands, must also be taken into account in dealing with the ciliary body. This is admittedly a deduction, but inasmuch as the conditions present render any direct observation of the intra-ocular secretion impossible during life, at least with the means at present at our disposal, we are necessarily thrown back on deduction, and, indeed, it seems unlikely that we shall ever have a better foundation to build on.

In support of the suggestion, that degenerative changes in the ciliary body may lead to excessive exudation in the chambers of the eye, Priestley Smith[4A], in the article above quoted, has evoked the analogy of the kidney in chronic nephritis, and has shown that even although fresh channels of excretion may be opened as a result of the increased force of secretion, the result will inevitably be a rise in intra-ocular pressure, due to the fact that the fluid is secreted under pressure higher than the normal.

As to the influence of alterations in vaso-motor pressure within the eye, it has been shown experimentally that irritation of the fifth nerve or of the sympathetic may be productive of a marked increase of intraocular pressure. This has, quite reasonably, been attributed to the influence of local vaso-motor dilatation. In this connection, we have to take account of the powerful influence of nervous conditions on the progress of an attack of glaucoma. It is well known that sleeplessness, anxiety, fatigue, hunger, and other similar conditions may determine the first onset of an attack of glaucoma, or may convert a simple into a congestive form of the disease. Again, we are all too familiar with the fact that very slight injuries to the head may eventuate in a wholly unexpected attack of high tension. Bearing in mind that a tendency to a loss of vaso-motor control is a constant accompaniment of the advance of life, it is not difficult to explain these phenomena. Once again, it is true that we are relying on deduction, but the physiological basis for our hypothesis would appear to be well-founded and trustworthy.

To assign to any individual case the *rôle* played by cell-degeneration, by nervous excitation of secretion, and by vaso-motor disturbances, would be obviously impossible; but we can at least conclude that the two latter will lead to more transitory and erratic rises in tension, whilst degeneration of the glandular elements will tend to favour a slowly progressive and permanent condition of hypertonus.

(b) An alteration in the nature of the secretion poured into the eye has been adduced as one of the possible causes of primary glaucoma. It is usually accepted that such a change in the chemical constitution of the aqueous is a powerful factor in the production of glaucoma, secondary to chronic and subacute forms of irido-cyclitis. From time to time, the suggestion has been made that a similar factor may be at work in certain cases which are usually accepted as being primary in origin. Such a supposition has two strong points in its favour:—(1) that the border-line between certain cases of acknowledged secondary glaucoma, and certain other cases which are usually classed as primary glaucoma, is sometimes a very narrow one indeed; and (2) that in cases of congestive glaucoma, phenomena closely allied to those which characterise inflammation, appear with great frequency. The readiness with which the formation of synechiæ occurs after operations for glaucoma, is one of the many evidences of this. It would be strange if under the circumstances there was not an increase in the albumen-content of the fluid secreted.

It might be suggested that the question could be settled by experiments. A perusal of the work of Uribe Y. Troncosco, Scalinci, and others, negatives this suggestion. The difficulties of such a form of research are very great, and most surgeons will probably agree that, unless and until new methods are found of investigating this very difficult subject, comparatively little positive evidence of any value is likely to be forthcoming.

Priestley Smith[4B] has put forward the following hypothesis, which is best reproduced in his own words.—"Chemically the aqueous and vitreous fluids are nearly, but not quite, identical, and they both proceed from the ciliary body; but, as already pointed out, they are probably produced by different zones, the aqueous by the processes, the more sluggish vitreous by the non-plicate zone. It is likely that senile degeneration may attack these zones separately or unequally, and that vitiation or over-production of the vitreous fluid may occur with normal production of the aqueous. In the final stage of chronic glaucoma there is certainly sometimes undue retention of fluid in the vitreous chamber, for the aqueous chamber becomes inordinately shallow, and the vitreous, if we examine it in the bisected eye, shows signs of serous infiltration—but here again we must beware of mistaking consequences of high pressure for initial causes." In support of his position, he cites some experiments made by Wessely, who, by injections into the vitreous, obtained an atrophy of the retina, choroid, and pars plana, with but little involvement of the ciliary processes. The vitreous body was totally abolished, while the production of the aqueous fluid was apparently unaffected.

The ideas are interesting and attractive, but manifestly and admittedly speculative. Once again, then, the only scientific position to take up is that of open-minded agnosticism. The time is not yet ripe for dogmatic assertion.

(c) It has been suggested that glaucoma is caused by a pathological tendency to hydrophyllism on the part of the tissues of the eye. This tendency is supposed to be brought about by an overloading of the tissues with acid products of metabolism. It has been assumed that the tissues swell in consequence of the increased absorption of water. If, for the sake of argument, we suppose that these premises are correct, we should not find it difficult to imagine that the swelling of the tissues might impede the exit of the intra-ocular fluid by narrowing the channels of excretion, and that it might, at the same time, obstruct the circulation by constricting the blood vessels as they pass into or out of the eye ; in that case, the veins would evidently suffer sooner and more than the arteries, and a condition of venous congestion would thus be set up. It is well-known that, as life progresses, the elimination of waste products from the tissues becomes increasingly difficult ; and so, if we were once to grant what Fischer and his followers have claimed, we should find the advance of years dominating this factor, as it does so many others. The influence of hydrophyllism can, however, only be accepted with hesitation and reserve. As the subject has already been discussed in a previous[8] article, it need not be pursued further.

(D) Closely allied with the subject of the preceding section is that of the various morbid conditions which lead to **autogenetic intoxication**, and which are associated with low forms of inflammation. These may be conceived of as acting :—(*a*) By obstructing the paths of exit of the ocular fluids, or (*b*) by hampering the ciliary muscle and so lessening the action, which, on Arthur Thomson's[9] authority, we presume that structure possesses of removing lymph from the eye (*Vide* previous articles).

This matter has been admirably put by S. D. Risley[10] in the following words.—"Glaucoma is a disease, coming on at an age when wear and tear, harassing vicissitudes, misfortunes, exposures, overwork and vicious living have sapped the physiologic foundations of life ; when infections have found entrance to the structure of the organism through the doorway of the epithelium ; and when a variety of toxic, auto-intoxic, and other influences have set up vascular and cardio-vascular disease, associated nephritis, uveitis, high blood pressure, etc. Glaucoma, in fact, rarely occurs in individuals in good general health."

Again, Lagrange[11] (always interesting and far-sighted in his views on glaucoma) has said that an eye attacked by hypertension is a sick eye in a sick body. It is not merely a hypertonic, but also a sclerosed, dystrophic organ, which shares its troubles with the rest of the body—a body in which renal and cardiac disease, the calculous and arthritic diatheses and neuropathy play leading parts. The secretions of the organ are toxic and anisotonic, whilst the channels of excretion are blocked. Indeed, the cases which find a place in the group we are now discussing are those which are most likely to be confused with, and which indeed are separated only by a fine boundary line from, one class of the secondary glaucomas. Once again overshadowing the accepted or the suggested causes of the disease, we find the sovereign, relentless spectre of the advance of years.

(E). As life advances, wide-spread, deep-seated, and extensive **changes** take place **in the vascular system**. There can be no question that these have a very considerable bearing on the causation of glaucoma. Looked at from the standpoint of physiological possibilities, it suggests itself, that a pathological rise in the intra-ocular pressure, may be due to one or more of the following factors :—(i.) An increase of the vascular pressure in the body generally. (ii.) A similar increase localised in the eye. (iii.) A lowering of the vaso-motor control in the body generally ; and (iv.) a similar change in the eye specially. In discussing this subject, the best course would appear to be to advance to our conclusions by a process of elimination, a plan which we shall accordingly adopt.

(i) **Is arterio-sclerosis a factor in the causation of glaucoma?** A very few years ago, the answer to this question would have been emphatically in the affirmative. The line of reasoning appeared perfectly clear. Arterio-sclerosis, like glaucoma, is a disease whose occurrence becomes much more frequent as life advances. With it is associated a rise in the systemic blood-pressure. The intra-ocular pressure is fundamentally dependent on the systemic blood-pressure and, in conditions of health, at least, it follows that pressure. What could be more natural than to conclude that arterio-sclerosis should bring about a rise in the ocular tension! Nor was the matter left to supposition alone, for various observers brought forward evidence to show that the systemic blood-pressure was higher in glaucomatous subjects than in healthy people of the same age. The inference appeared to be that the raised blood-pressure *was* a factor in the causation of glaucoma. Within the last few years, however, a number of investigators have shown that these views had been too readily accepted. Kraemer[12] and Alexandre[13] were amongst the earliest to voice independently the view that the relationship between arterio-sclerosis and glaucoma had been too lightly assumed. Craggs and Taylor[14] (in Madras) made a careful comparison between glaucomatous subjects and healthy people of the same age. Their results were in contradiction of all that was generally accepted at that time. They wrote as follows. . . . "it was often noticed that tensions ranging from 180 to 208 mm. of Hg. were recorded in subjects whose intra-ocular tensions was normal, and with no signs of glaucoma whatever . . . . On the other hand, there were a number of cases of glaucoma with phenomenally high ocular tension (70 to 80 mm. of Hg.) . . . who nevertheless had normal blood-pressure." Whilst not denying that high arterial tension might be a factor in the production of glaucoma, they considered that their work showed "that a high arterial tension is very far from being a necessary factor" in the causation of the disease. Later, the experience of Sattler[15], of Leipzig, confirmed that of the workers just quoted. He also drew attention to the fact that those who are suffering from diseases associated with high blood-pressure, are not specially prone to glaucoma; their eye troubles are of another kind, being usually due to local diseases of the vessel walls; nor had he seen glaucomatous attacks which could be directly attributed to an increase of blood-pressure during violent muscular exercise. On the contrary, the exhaustion and heart failure which follow over-exertion, mental depression, and weakening diseases (*ex. gr.*, influenza), are frequently associated with glaucoma. Priestley Smith[16] pointed out, on theoretical grounds, that chronic excess of blood-pressure in the larger vessels is no evidence of a similar excess of pressure in the capillaries which secrete or transude the intra-ocular fluid; on the contrary, it might be expected to be associated with increased resistance in the arterioles, and hence with an insufficient capillary circulation. Still more recently, Foster Moore[17] has dealt with the same question. He found that subjects of arterio-sclerosis with a very high blood-pressure, might show no sensible increase in ocular tension; that patients with a great increase of tension (primary glaucoma) might have a blood pressure little above the normal; and that in patients with retinal arterio-sclerosis, a surprisingly small amount of digital pressure—well below the normal—produced retinal arterial pulsation. He concluded that the change in the arteries, which we speak of as arterio-sclerosis, actually opposes a resistance to the normal transmission of pressure along the vessels, and causes the blood to be distributed to their capillaries at a pressure decidedly below the normal. It is of interest that when working independently and from a different standpoint, he should have reached the same conclusions as Priestley Smith. The whole subject will be found more fully discussed by the writer in THE OPHTHALMOSCOPE of July, 1915. The reader is also referred to an article on the same topic by

Alexander MacRae in the April number of the same journal. One of the most interesting points made in that paper is that the actual reading in mm. Hg. obtained by a sphygmomanometer is not necessarily a correct indication of the intra-vascular pressure, since the resistance of the artery wall to the obliteration of its lumen, may form no inconsiderable part of the whole reading. Notwithstanding this source of fallacy, we shall not be wrong in asserting that well-founded medical opinion to-day answers the question that heads this section in the emphatic negative, and holds that there is no obvious causal relationship between arterio-sclerosis with its attendant rise of systemic pressure and the onset of glaucoma. Before leaving the subject we may mention that Kleckowski stated, some years back, that the blood of glaucomatous patients could be shown to contain adrenalin ; his work was founded both on biological and on chemical tests. The subsequent investigations of Löhlein[19], of Vogt and Jaffe[20], and of others, has altogether failed to confirm any such finding, which was apparently due to faulty *technique*. (ii.) As to the influence of an **increase of vascular pressure localised in the vessels of the eye**, all that can be said is that whilst it is a factor which we cannot exclude, and which indeed may on occasion be of very great importance, our present methods do not permit us to investigate the subject, and it would therefore be most unwise to dogmatise on what we so little understand.

(iii. and iv.) Finally, we may take together the question of **loss of vaso-motor control** in the body generally and in the eye specially. It is universally accepted that interference with the normal circulation through the globe is a leading feature of congestive glaucomas. It has been contended in the previous pages of this article that vascular disturbances play a not unimportant *rôle* in the simple cases as well. All that we know of the exciting causes of glaucoma is in conformity with the view that the great majority of them act by interfering in one way or another with the vaso-motor control, either in the body generally, or in the eye individually, or in both. Pass in review a list of these causes :—cold, hunger, starvation, sleeplessness, nervous or bodily exhaustion, anxiety, sorrow, constipation, bronchitis, cardiac or hepatic obstruction, and so on ! Are they not one and all of them calculated to interfere with the quiet, even interplay of physiological functions, and to lead to disturbances of the vascular balance, and especially to congestion of the nervous system ? Does not the passage of years, with all that it connotes, play into the hands of the enemy, by rendering the body less able to resist all those constantly recurring shocks, which youth laughs at, but which age must sooner or later succumb to ? Lastly, does not every influence which tends to restore a quiet even control of the vascular system, find its place in our repertoire for the non-operative treatment of glaucoma ?

REFERENCES.

1. **Smith, Priestley.**—"Glaucoma," J. & A. Churchill, 1891, pp. 90 to 94.
2. **Haag, C.**—*Klinische Monatsblätter fur Augenheilkunde*, Vol. LIV, p. 133. vide *Ophthalmic Literature*, July-August, 1915, p. 106.
3. **Parsons, H.**—"Pathology of the Eye," Vol. III, p. 1072. Hodder & Stoughton, London.
4. **Smith, Priestley.**—*Ophthalmic Review*, January, 1912, p. 6.

4A. **Smith, Priestley.**—*Ibid.*, p. 5.

4B. **Smith, Priestley.**—*Ibid.*, p. 8.

5. **Bjerrum, J.**—*Klin. Monatsbl f. Augenheilkunde*, January, 1912, p. 42, quoted in *Ophthalmology*, Vol. VIII, p. 541, 1912.

5A. **Kuemmel.**—*Muench. med. Woch.*, 1914, and *Annals of Ophthalmology*, April, 1915, p. 354.

6. **Verhoeff, F. H.**—*Archives of Ophthalmology*, Vol. XLIV, No. 2, p. 138, 1915.
7. **Elliot, R. H.**—THE OPHTHALMOSCOPE, Vol. XIII, p. 241, 1915.

8. **Elliot, R. H.**—*Ibid.*, January, 1916.
9. **Thomson, A.**—*Ibid.*, Vol. IX, p. 474, 1911.
10. **Risley, S. D.**—*Ibid.*, Vol. XII, p. 83, 1914.
11. **Lagrange, Felix.**—*Proceedings of XVII International Congress of Medicine*, London, 1913, Section IX, Ophthalmology, p. 71.
12. **Kraemer, R.**—Graefe's *Arch. f. Ophth.*, Vol. LXXIII, p. 349.
13. **Alexandre.**—*Paris Thesis*, 1912 (vide *Year Book of Ophthalmology*, 1913).
14. **Craggs and Taylor.**—THE OPHTHALMOSCOPE, 1913, p. 350.
15. **Sattler, H.**—*Berliner klin. Wochenschrift*, 1913, Nos. 49 and 50 (*Ophthalmic Review*, Vol. XXXIII, 1914, p. 89).
16. **Smith, Priestley.**—*Ophthalmic Review*, January, 1912.
17. **Moore, Foster.**—*Royal London Ophthalmic Hospital Report*, Vol. XX, Part 1, p. 108, May, 1915.
18. **Kleczkowski, T.**—*Klin. Monatsbl. f. Augenheilkunde*, October, 1911, p. 417.
19. **Löhlein, W.**—*XXXVIII Ophth. Congress*, Heidelberg, p. 142, 1912.
20. **Vogt, A., and Jaffé, B.**—*Klin. Monatsbl. f. Augenheilkunde*, July, 1912, p. 23.

(To be concluded.)

SOME ASPECTS OF OPHTHALMOLOGY IN PALESTINE.

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(Concluded.)

Prophylaxis.

Those who attend ophthalmia patients cannot be too careful in guarding against infection. In a country where for months together one sees 50 or 60 acute cases a day, familiarity is apt to breed contempt.

Spectacles with a gauze screen should always be worn to keep out the flies.

The hands should be well washed with soap and water between each case, and before the handkerchief is touched, they should, in addition, be placed in a disinfectant. If the handkerchief become infected, sooner or later the doctor or nurse will contract ophthalmia. If the slightest carelessness be shown, the most disastrous results may follow. While I was in Palestine I saw three nurses who had become infected—one lost an eye, another received permanent damage, and one recovered.

Symptoms.

The symptoms vary somewhat, according to the nature of the organism in question, but the cases are so similar that one description will suffice for every type of infection, the slight variations being mentioned.

The onset is rapid, one eye generally being affected first. The disease may commence as a catarrhal conjunctivitis which may recover, or a mucopurulent discharge may appear, which may become purulent. Some cases have a mucopurulent discharge from the first.

The mild cases show a pink injection of the conjunctiva. In the Koch-Weeks' infection mild examples may have subconjunctival ecchymoses, whereas in pneumococcal infection there is a strong tendency to chemosis, even in slight cases.

Pain is generally slight or absent, but may be severe. Photophobia is not a symptom of uncomplicated ophthalmia, even in the full glare of the subtropical sun. If photophobia be present, it indicates that the eyes have been bandaged, or that there is implication of the cornea or iris.

In a certain type of lymphatic, ill-fed, strumous child there is intense photophobia, lacrymation, and blepharospasm, associated with nasal catarrh. This condition may be present for months after the ophthalmia has been cured. It is best met by cold baths and general hygienic treatment. We see identical conditions among our own strumous children. In Palestine the cases during the epidemic period are so severe that one cannot gain much information as to the causal micro-organism from the clinical picture. Cases due to the Koch-Weeks' bacillus, the pneumococcus, and even the diplobacillus of Morax-Axenfeld, may be identical. As we have stated, the gonococcus in summer almost invariably attacks the cornea, although in winter it may cause only a catarrhal conjunctivitis. I have found the gonococcus in a mild case, which rapidly yielded to treatment. In severe examples of ophthalmia there is an abundant discharge, which often forms strings which cover the cornea. The globe is intensely congested, and the palpebral conjunctiva is swollen and turgid.

The corneal margin can be seen with a lens to be vascularised for from 1 mm.—2 mm. from the periphery, and the pericorneal tissue is turgid.

In still severer cases there is great chemosis and a thick purulent discharge, which may be greenish. In some cases of severe pneumococcal infection there may be a pseudo-membrane of the palpebral conjunctiva. I have recently seen such a membrane in a comparatively mild case of pneumococcal conjunctivitis. In children the conjunctiva becomes swollen and sponge-like, and bleeds at the slightest touch. It may give rise to an enormous ectropion, which can be reduced only with difficulty, and at once returns.

Under treatment ophthalmia lasts from a few days to a month or more; but untreated, the cases may become very chronic, and drag on for months.

The typical epidemic case caused by the Koch-Weeks' bacillus is generally easily cured; pneumococcal ophthalmia is apt to become chronic.

The Koch-Weeks' type has a great tendency to relapse; the first infection seems to confer no immunity, for an individual may have three or four acute attacks during the summer. In general, the eye first attacked has the severer conjunctivitis.

Prognosis.

The prognosis is generally good in the Koch-Weeks' affection when early treatment is undertaken. The same is true in a slightly less degree of the pneumococcal affection, but there is much greater danger to the cornea.

Infections with the diplobacillus of Morax-Axenfeld are rarely severe, and seldom attack the cornea. They are liable to become chronic, but, as a rule, yield to solutions of zinc sulphate or chloride, if these be employed in sufficient strength.

A mixed infection containing the diplobacillus is generally very chronic, and resists treatment. The prognosis in a gonococcal case is always bad, and generally very bad.

Taking the cases as a whole, the statistics of five years' cases at the British Ophthalmic Hospital, gathered from 5,700 cases, show that 22 per cent. of the cases of ophthalmia which came to the hospital already had or acquired corneal lesions, and 40 per cent. of all these ulcers perforated. Of these perforated ulcers at least half were caused by the gonococcus, either alone or in mixed infection.

Complications of Ophthalmia.

As has been already stated, the cornea is affected in about one-fifth of all cases. The peripheral vascularisation of the cornea, which is generally present in severe cases, may become more intense, and lead to an acute pseudo-pannus, or to a violent general keratitis, which may end in sloughing of the whole cornea.

The pericorneal œdema may cause the same appearance as a large clear shallow ulceration of the whole cornea; such clear ulcers are not uncommon in children suffering from ophthalmia. A drop of fluorescein differentiates the two conditions.

A localised infiltration or general corneal haze is common, and often rapidly disappear under treatment. Onyx and other localised collections of pus in the layers of the cornea are not very rare. They may become absorbed or may discharge by a small opening upon the surface of the cornea.

Panophthalmitis is an infrequent result of ophthalmia. Iritis, apart from ulcers of the cornea, is rare. I have seen it about five times in 5,000 cases, and two of them were associated with acute non-purulent ophthalmia. If neglected, extensive posterior synechiæ may form. Hypopyon is sometimes seen in a case without ulceration. I have never detected keratitis punctata. In these hypopyon cases the pupil is mobile, and the iris has a normal appearance.

Corneal Ulcers.

Ulcer of the cornea is the commonest complication of ophthalmia, and may be the only sign of the disease, for during the epidemic a case often appears, showing a small clear ulcer of the cornea unaccompanied by inflammatory signs.

It is difficult to say what proportion of all cases of ophthalmia are complicated by ulcers, for naturally the severer cases are more likely to come to the Hospital. I should put the figure at 10 per cent.

Ulceration generally takes place during the first three days of the disease; it is only exceptionally that a cornea ulcerates when the eye has come under treatment. The ulcers may be caused by the gonococcus, the pneumococcus, or the diplobacillus. In two cases of severe ulceration I could detect only the diplobacillus; in one of these it was intracellular. Some diplobacilli were seen half imbedded in a polymorphonuclear cell. Intracellular forms are very unusual; I have detected them only in two smears.

Types of Ulcers.

The commonest type is a large ulcer near the centre of the cornea. These are often very deep, with sharply-cut edges, and may extend down to Descemet's membrane. At this stage all the finest iris markings can be seen through the floor of the ulcer, and the margin alone takes the green colour of fluorescein, for Descemet's membrane does not stain.

These ulcers are generally not vascularised. Under appropriate treatment, they usually heal, leaving a leucoma, but all too frequently a bulge appears in the floor, and perforation ensues. Healing commences at that edge which is nearest to the periphery of the cornea.

Another very frequent type is the crescentic marginal ulcer. They are deep, with ragged edges; they become vascularised when healing commences. Both these varieties are apt to cause a small hypopyon, and subacute iritis is often present.

If these ulcers are caused by the gonococcus, they spread rapidly. At one edge of the ulcer the corneal layers become infiltrated with pus. This area breaks down and the ulcer advances.

A third common type is the clear facetted ulcer. It is small, and situated halfway between the centre and the periphery of the cornea. It looks as though a piece of the cornea had been removed with a small sharp gouge. It has a shelving edge, is never deep, and does not perforate. It causes little pain or photophobia, and there is not much injection of the eye. It heals with a transparent facet, which, however, may eventually become opaque. It is caused by the Koch-Weeks' bacillus, the pneumococcus, or by a mixed infection, but never by the gonococcus.

In a fourth variety there are several minute but deep ulcers, like gimlet holes, scattered irregularly over the cornea.

A fifth type is similar. There is a circle of small superficial ulcers about the size of a pin's head, arranged in a complete circle halfway between the limbus and the centre of the cornea. Both these types heal readily when treated. They are generally seen in children suffering from mild ophthalmia. They may coalesce, and may co-exist with a more serious ulcer.

A sixth type is the very rare superficial dendriform ulcer. It spreads with great rapidity, and in three days may involve the whole cornea. These ulcers are too extensive and superficial to cauterise, but they heal rapidly under atropine.

Ophthalmia ulcers often assume the phlyctenular form, and these may perforate.

Sequelæ of Ophthalmia.

These are leucomata, simple and adherent; large adherent cicatrices, which often stretch and form enormous staphylomata; atrophy of the globe ; nebulæ, and facets.

In many patients who have suffered from ophthalmia, probably associated with slight corneal haze, there is loss of visual acuity, and the fundus details cannot clearly be seen. By oblique illumination, the cornea looks normal, and little may be seen with a platyscopic lens ; but when examined with a small flat mirror with + 20 D.sph. behind it, the cornea looks like ground glass, and in many cases, a delicate network of the remains of a former vascularisation can be made out. In fact, the condition has some similarity to that left by interstitial keratitis. Secondary glaucoma often results from adherent leucomata, and I have on one occasion seen an attack of mild sympathetic iritis follow a perforation with encleisis of the iris.

Treatment.

In the summer of 1905 I made a series of comparative tests between silver nitrate, protargol, and argyrol. Cases were chosen in which the two eyes were equally affected, and the test drugs applied, one to the right eye, the other to the left. Silver nitrate was used in 2 per cent. strength, the other two in 33 per cent. The results were as follows .—

Silver Nitrate versus Protargol.

Protargol superior in	66	per cent. of the cases.
Equal results in	24	„ „
Silver nitrate superior in	10	„ „

Protargol versus Argyrol.

Protargol superior in	50	per cent. of the cases.
Equal results in	49·55	„ „
Argyrol superior in	0·45	„ „

Silver nitrate and argyrol seemed to be about equally efficient.

Since making these tests I have used protargol almost exclusively in the treatment of ophthalmia. The eye should be tied up only when there is a corneal ulcer, and the discharge has ceased. The eye should be frequently irrigated with either 4 per cent. boric lotion or 1—5,000 solution of perchloride of mercury. The mucoid strings, which constantly form, act as foreign bodies, and must be washed out.

Once a day the lids should be swabbed with a 33 per cent. solution of protargol, and an excess should be left in the eye, so that the drug may penetrate into the folds of swollen mucous membrane. The protargol is best applied with a pellet of wool held in catch forceps A collyrium of 5 per cent. solution of protargol should be used every two, three, or four hours, according to the severity of the case.

If one eye be unaffected it should, for prophylactic reasons, be treated with a 5 per cent. solution of protargol. I have never employed Buller's shield, and do not use it now, even in gonorrhœal ophthalmia. If the case does not improve under protargol, it is wise to make a change, and to use silver nitrate solution in 2 per cent. strength.

In a 2 per cent. solution, silver nitrate need neither be neutralised nor washed out. It should never be employed in a strength greater than 3 per cent., and this, in the case of infants, should be subsequently washed out.

If the diplobacillus of Morax-Axenfeld be present, zinc should be used after the first few days. Zinc sulphate can, if desired, be mixed with the protargol solution. I do not think in Palestine a solution of zinc sulphate weaker than 1 per cent. is of much use, and I have employed a 2 per cent. lotion with advantage. I have often successfully treated corneal ulcers caused by the diplobacillus with a 1 per cent. solution.

All cases which become chronic and resist treatment should be examined microscopically, and if the diplobacillus be detected, zinc sulphate or chloride should be used energetically until the condition improves.

Most cases of ophthalmia which have lasted for a month or more are favourably influenced by the mercuric oxide ointment in 1 per cent. strength.

I have tried permanganate of potash in a 10 per cent. solution in the treatment of ophthalmia and found that it was painful and ineffective.

As soon as the cornea becomes affected, atropine should be used. In Palestine I mixed it with the partagol solution. I am convinced that protargol exerts a favourable influence upon the healing of the corneal lesions.

If there be no discharge, the eye should be bandaged as soon as an ulcer is detected.

If the floor of the ulcer be covered with slough, a little iodoform may be dusted in once or twice a day, and an ointment containing atropine and yellow oxide of mercury may be *massaged* in once a day. If in spite of these measures the ulcer begins to spread or deepen, no time should be lost ; it must be treated with the actual cautery or with pure phenol. If there be an area of infiltrated cornea in advance of the ulcer, this area must be relentlessly destroyed, even if the cautery reach Descemet's membrane. The resulting leucoma will be far smaller than that left by the ulcer if it continues to advance.

In Palestine I found that the cautery, and especially phenol, cause great irritation, and that half the cases so treated developed a hypopyon One or two, indeed, did very badly. I therefore reserved the cautery until I saw that milder measures were insufficient.

As soon as the floor of the ulcer begins to bulge, paracentesis, or corneal section, is necessary, and I think the latter is by far the better treatment.

Recent prolapses are best left alone. Later on, when the eye has quieted down, a Graefe knife should be passed through the mass and a crescentic piece removed from each side with scissors. A bandage is applied, and the cornea gradually flattens down.

When a prolapse has healed and an adherent leucoma has formed, secondary glaucoma may supervene. This is often of a temporary character, and may be relieved by atropine. Iridectomy is often called for, but the iris is frequently bound down and friable, and a satisfactory iridectomy is technically impossible to obtain.

Later on, an optical iridectomy may be necessary to improve the vision. One should never be in a hurry to operate. If the eye be not quite quiet, the coloboma will close up again, and the cornea over it will become hazy. In children, too, leucomata clear up in a marvellous fashion, and an operation is superfluous. The large majority of leucomata lie towards the nasal side of the cornea, so the artificial pupil must be placed downwards and outwards.

Small anterior synechiæ are best left alone: they do no harm. Very small ones can be divided with a suitable knife, but the operation is much more difficult than it seems.

Trachoma.

The subject of trachoma is so large that it would demand a lecture to itself, and I propose to say only a few words on the subject.

The disease is seen in Palestine in its severest forms, and it is almost universal. In many areas of the country, few of the inhabitants escape. Quite young infants show trachoma fully developed, and children three years old may suffer from trichiasis. Researches upon the cause of trachoma should be carried out in Palestine or in Egypt rather than in Europe.

There are two chief varieties of trachoma seen in Palestine—the papillary form and the follicular, although doubtless a few follicles are present in the papillary type.

Pannus is seen in every degree of severity. It may commence at the upper segment of the cornea and develop downwards, or may commence below and advance upwards. In other cases the pannus develops above and below, and meets in the centre. In many examples of pannus the whole cornea is covered by a fleshy mass of a violet hue. This type clears up very rapidly when treated with yellow oxide of mercury and atropine

After trying several methods of treatment, I believe that the old remedies for trachoma are the best. The lids should be touched daily with a copper-alum pencil, and yellow oxide of mercury ointment must be well *massaged* in twice a day. "Expression" is a valuable procedure in the juicy follicular cases. I have occasionally excised the fornix, but I doubt whether it is wise to remove any conjunctiva. I have no experience of excision of the tarsus.

Trachoma frequently infects the lacrymal sac. These sacs are very friable, and rupture with extreme ease. For this reason *lavage* is dangerous. I had an unfortunate experience with one case. After *lavage*, an orbital abscess developed, which ended in optic atrophy. I knew of another similar accident. The correct treatment is to excise the sac.

I need not discuss the treatment of trichiasis here, because I read a paper on this subject before the Oxford Ophthalmological Congress which was published in THE OPHTHALMOSCOPE for November, 1914. The two most satisfactory operations, in my hands, have been Snellen's and van Millingen's lip-grafting method.

Spring Catarrh.

This disease is fairly common in Palestine, and may be very severe. In one case the cornea was almost hidden by the limbal growth, and vision was in consequence very poor. We found that no treatment was of any value, but recently I have had a very satisfactory result from radium applications. In Palestine the diagnosis is apt to be difficult, because spring catarrh may co-exist with trachoma. The microscopical examination of the secretion will show the increase of eosinophil cells, which is characteristic of the disease.

Pterygium.

Pterygium is very common, and operations were frequently performed. A plastic operation must be chosen, which turns the growing point of the pterygium away from the cornea. The results were almost always satisfactory.

In conclusion, I hope that I have succeeded in showing that ophthalmic surgery in the East may contribute facts and experiences which are very helpful to our work in England. There is a vast and almost virgin field for research, which I hope may in happier times be more fully utilised. Up to the present little or nothing has been done.

[THE END.]

CLINICAL AND PATHOLOGICAL MEMORANDA.

DOUBLE CATARACT FOLLOWING EXPERIMENTAL TOTAL THYROIDECTOMY IN A DOG.*

BY
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THE dog having been fed for several days only on milk, was subjected to total excision of the thyroid gland and the parathyroids. He was kept on a diet of milk only, to which 30 grains a day of lactate of calcium were added.

He remained well till the nineteenth day, when he appeared dull, did not stand up, and had tremors. An intravenous injection of eight grains of lactate of calcium was given. The next day he was better and had no tremors. The day after that he was well, but four days later, the symptoms returned. Another injection of lactate of calcium was given. He was immediately better and remained so the next day. But the day after that he had a return of symptoms, when a third injection was given. The next day he was well, and remained so for nine months, when he had a fit, but he had only one fit, and remained well for one year and five months after the operation. It was then noticed that he was somewhat thin, and also bald on the inside of his thighs and to some extent on his head. He was ordered cream in addition to that contained in the milk, which was his sole diet. He regained his condition, so that after a time the cream was stopped, and he remained well for another six months, except that he was noticed to be losing his sight from double cataract.

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* Read before the Section of Ophthalmology of the Royal Society of Medicine on February 2nd, 1916.

The late George Coats kindly saw the dog, and reported as follows :—"The lens opacity does not seem to be due to any disease of the eye itself; the pupil is active and the dog seems to have perception of light, although it cannot avoid obstacles. I should think the cataract is undoubtedly due to general nutritional changes connected with the removal of the thyroid and with the fits which, I believe, followed it. This association of cataract with extirpation of the thyroid and 'tetany' is known in the case of man."

A few days later, the dog was weak, dull, and had tremors. An intravenous injection of calcium lactate was given, and the next day the dog was much better; but in a few days he died, no doubt as a late result of the operation performed just two years previously. A *post-mortem* examination was made: the pituitary was large, in all probability enlarged; it was very vascular, the secreting cells were very large, and some contained two nuclei.

The eyes were handed to George Coats, who reported. "I do not think any change can be detected in the lens epithelium either in horizontal or coronal sections: compared with the normal dog's eye, I should say there was a certain amount of infiltration of the ciliary processes with loosening and tightening of the pigmentation of the outer layer of the epithelium, the inner layers of the stroma show a little of the same thing. The aqueous contains a good deal of fibrinous coagulum, perhaps indicating an alteration in composition. These changes may have to do with the cataract, or may possibly be due to slight inflammation before the animal's death. Before coming to a definite conclusion, it would be necessary to know whether they are constantly present in thyroidectomy cases, and as regards the pigmentation it would be necessary to make a comparison with the condition in animals of the same breed, and, if possible, of approximately the same age.

"The cataractous changes themselves do not belong to any very special type. They are most developed in the deeper layers of the cortex, where senile changes most often begin in the human eye. They are not of distinctly lamellar type. In one eye there has been a rupture of lens capsule on both sides just behind the equator with escape of some lens substance and formation of capsular cataract on the outer aspect of the capsule; but I think this must be secondary, and caused most probably by swelling of the lens as it became cataractous. It is in the region of the insertion of the posterior fibres of the zonula where probably there would be some strain, while the capsule is thinner there than at the insertion of the anterior fibres."

Remarks.

Although in this dog both the thyroid and the parathyroids were removed, its symptoms and death were probably due mainly to the removal of the parathyroids, as tremors, which occur after this operation, were present shortly before death. To the same cause, it would seem, should be attributed the cataracts.

There are on record at least two cases of goitre, in man, in which an operation on the thyroid had been carried out, and in which cataract followed. In both cases there was tetany.

CASE I.—Recorded by A. Westphal. Patient was a woman who, since 1881, had suffered from an enlargement of the thyroid gland. In May, 1895, the gland was completely removed by operation. The second day after the operation, there were symptoms of tetany. In January, 1900, she was admitted to hospital. She had then an apathetic expression ; she suffered from tetany and epileptic fits, and also had double cataract. The symptoms point to the removal of the parathyroids as their main cause.

CASE 2.—Recorded by A. Schiller. A woman, aged 36 years, had from the age of 22 years an enlargement of all three lobes of the thyroid ; they now caused difficulty of respiration and aphonia. An operation was performed by Czerny in June, 1890. The goitre was to a great extent removed, but part of one lobe was left ; the trachea was found compressed. Two days after operation, tetanic spasms occurred, especially in the lower half of the body ; a few days later, there appeared albuminuria (without casts), œdema of hands, and mental dulness. The following winter the tetany continued, and cataract appeared in both eyes ; the right eye was operated on. The next summer there was cachexia, the skin was dry, and the hair and nails fell out. In the autumn the nephritis became acute, and the patient died.

The tetany here spoken of is probably distinct from the carpo-pedal spasm of children, sometimes called infantile tetany ; but the administration of parathyroid gland is said by Bliss to have been found of benefit in some cases of this disease.

With respect to treatment, in dogs which have been operated on, the best treatment seems to be to give calcium by feeding them wholly on milk (which contains much calcium), or, if the symptoms are severe, by the intravenous injection of the lactate of calcium. This with me has proved better than the administration of parathyroid gland.

In tetany, following a thyroid operation in a woman, Halsted treated the symptoms (which he attributed to removal of parathyroid) with the parathyroid from the ox with much benefit : "the effect of the parathyroid exhibition was almost instantaneous and most marvellous."

Hertz also has recorded the case of a patient, who a few months after an operation on the thyroid for goitre, became restless, nervous, sleepless, tremulous, and thin ; treatment with parathyroid was successful : "the remarkable effect of treatment with dried parathyroid gland after everything else had failed, makes it very probable that the group of symptoms from which the patient suffered was the result of parathyroid insufficiency."

REFERENCES

1. **Westphal, A.**—*Berliner klinische Wochenschrift*, Vol. XXXVIII, No. 33, August 10th, 1901.
2. **Schiller. A.** *Beiträge zur klinischen Chirurgie*, Vol. XXIV, 1899, p. 580, Case 97.
3. **Bliss. R. W.** *Archives of Pediatrics*, Vol. XXVIII, 1911.
4. **Halsted.** *American Journal of Medical Science*, July, 1907.
5. **Hertz, A. F.** *Guy's Hospital Reports*, Vol. LXVII, 1913.

CONJUNCTIVAL FLAPS IN CATARACT OPERATIONS.

BY

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IN this paper I wish to discuss the advantages and disadvantages of conjunctival flaps in the capsulotomy and intracapsular operations, after a fair and liberal personal experience.

Conjunctival flaps are illustrated by the diagrams I, II, III, and IV.

To make any of these flaps it is much easier, although not absolutely essential, if the conjunctiva is first ballooned up by a solution of novocaine and adrenalin, which more or less controls the hæmorrhage, and very much facilitates the dissection. Adrenalin has the great drawback, like all other vaso-constrictors, in that, when the effects pass off, its action is followed by vaso-dilation and consequent hæmorrhage from the lacerated or cut vessels of the conjunctiva after the operation is finished. This implies hæmorrhage into the aqueous chamber. Although the field may be comparatively dry when the patient leaves the table, the fact can be observed the following day.

I may consider conjunctival flaps in what I regard as their order of merit :--
Stanculeanu's flap as illustrated in Fig. I.

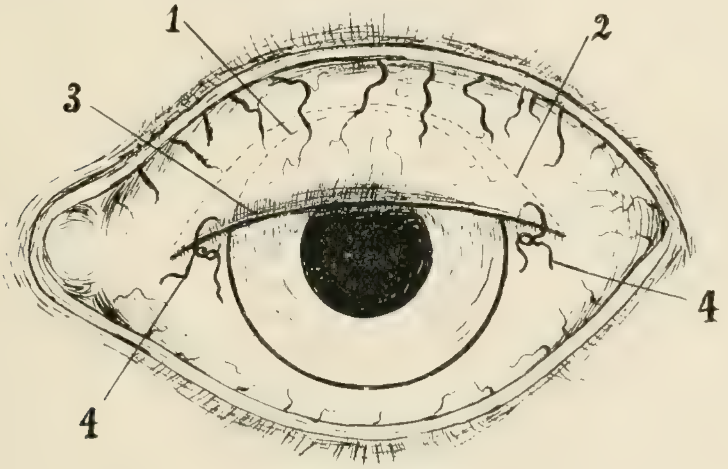

Fig. I.—Operation completed and stitches inserted.

1. Sclero-cornea
2. Preliminary incision through the conjunctiva.
3. Conjunctiva drawn down over the cornea by the stitches 4 and 4.

Stanculeanu does intracapsular extraction. His method, except as regards the flap, does not concern this article. In the above diagram 2 illustrates the position of his conjunctival incision made with scissors as the first step of the operation. Through this incision the conjunctiva is separated from the sclerotic right round to the fornix. The stitches 4 and 4 are inserted, but not tied. The sclero-corneal wound is then made in the limbus, leaving no conjunctiva attached to the corneal flap. The lens is extracted, the iris replaced, and the two stitches tied, drawing the dislocated conjunctiva down over the cornea to the position of line 3 in the diagram. For this flap is claimed all the advantages of the other flaps, and, in addition, that it maintains by its pressure the close apposition of the sclero-corneal wound. It will be seen that this latter claim, which brought this flap into existence, is a desideratum in all conjunctival flaps. Claims are all very good. Does practice justify these claims? Apart from the difficulty of making the sclero-corneal wound the exact size we want it to be, in combination with a dislocated conjunctiva and with blood, this flap does not always draw into the neat position in the diagram, nor does it always stay in that position for any length of time. It not infrequently draws up too early, and becomes adherent in the sclero-corneal wound itself, leading to serious complications.

The time it takes to do this operation, which makes very heavy calls on the patient's nerves, the amount of traumatism caused, which is very marked even at the end of ten days, and the fact that the tying of the sutures tends to increase the danger of loss of vitreous, all these things combined have made me discard this operation. In intracapsular operations, for those who insist on a flap, it is incomparably the best of the flap operations, as it allows the operator a fair chance to deal with complications, such as ruptured capsule, escape of vitreous, and admits of easy replacement of the iris. All the other flaps make these matters much more difficult, and some of them impossible.

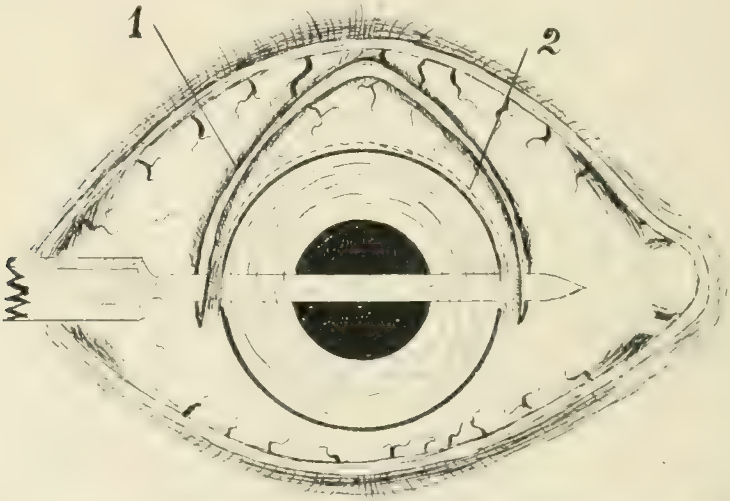

Fig. II.—The line (1) illustrates the preliminary conjunctival incision. The dotted line (2) illustrates sclero-corneal incision.

2. Figure II illustrates the next best of the conjunctival flaps. After ballooning up the conjunctiva by adrenalin and novocaine solution, the incision 1 is made with scissors, and reflected back to the sclero-corneal margin throughout. It is then replaced, and the sclero-corneal wound made beneath it. The lens is extracted, the iris replaced, and the flap replaced either with or without one or two small catgut stitches. The claims advanced for this proceeding are that sufficiently sound union of the conjunctival flap takes place within a few hours, and thus prevents all the evils of sepsis, prolapse of iris, etc. I have done a good number of cases with this flap, and found it to involve so many drawbacks that I have ceased to employ it. Among these are the hæmorrhage into the aqueous chamber following the operation after the patient leaves the table, the mass of loosened conjunctiva, the blood at the time of operation whether adrenalin be used or not. These two latter so much obscure the field that it is exceedingly difficult to make the sclero-corneal incision exactly where the operator wants it, either in circumference or in depth. If it is too deep we wound the vascular area, causing more hæmorrhage, and in such deep wounds we are very apt to get a prolapse of iris close to its ciliary attachment, a condition which I look on as a very serious matter, as incarceration of the pupillary margin of the iris is fraught with no ulterior consequences more than its incarceration; whereas incarceration of the iris close to the ciliary body in the angle of a wound that is too deep, is generally followed by a low form of uveitis which ultimately destroys the eye.

If the wound is too small, the operator would be better not to attempt intracapsular extraction through it, as the capsule under such conditions invariably bursts. If the difficulties in making the sclero-corneal incision arise in the hands of a very experienced operator, what can the beginner expect? As in all other flaps, it requires an exceedingly good patient to behave properly while this proceeding is being carried out. If vitreous presents before the lens in intracapsular extraction, the difficulties of the operator are much intensified. If the capsule bursts, as it will do in the hands of the most experienced in a certain percentage of cases, the operator can do nothing but leave it behind with a lot of lens matter, the result being a capsulotomy operation in its worst form, to be followed by its worst results. In these cases the flap is an abomination.

Assuming that all goes well, the rapid attachment of the conjunctival flap, and the effusion of aqueous, with its tendency to normal pressure, props open the sclero-corneal wound and prevents it from uniting in many instances, resulting in something of the nature of a cystoid opening; the net result of which is a huge amount of astigmatism and the possibility of late infection, such as we know to occur in trephining for glaucoma. This latter is not a theoretical objection. I have seen enough of late infections in trephining not to court them in cataract extraction when they can be avoided.

Like Stanculeanu's, this flap is also liable to be caught up in the wound. No matter what flap is made, it cannot for a moment claim to be protective against prolapse of iris. When this occurs in the simple sclero-corneal incision, we can cut it off without difficulty, but in conjunctival flap operations we must dissect the conjunctiva off it and then cut it off, by no means a simple proceeding with a patient grown irritable, as they all do when such complications occur. In my experience, the conjunctival flap is no panacea against sepsis. In intracapsular extraction, sepsis depends on other conditions. Conjunctival flaps have a *raison d'être* in the capsulotomy operation, in that tags of capsule frequently hang out of the sclero-corneal wound and do not unite with the other tissues for several days, thus constituting a drain for the infection of the remaining lens matter, an admirable nutrient medium for germs: a conjunctival flap shuts off this drain. Such tags do not remain when the lens has been removed in its capsule, and consequently such protection, both in theory and in practice, is not necessary.

Any of these flaps, except Stanculeanu's, renders intracapsular extraction impossible as a routine measure. Cases would have to be selected. All irritable patients would have to be excluded; all cases of Morgagnian cataract would have to be excluded on account of the liability of the capsule to rupture; the hypermature cataract would be by no means easy, as, in such cases vitreous is most likely to present before the lens; and all cases in which the incision turned out to be too small, a by no means negligible figure. An operation which has so many negative qualities and so few positive advantages is, in my opinion, prohibitive.

This flap can also be made after the manner of Fig. III.

The conjunctiva is ballooned up as in the previous cases. The knife, as in Fig. II, is passed through at the limbus and made to cut the sclero-corneal wound and the conjunctiva at the same time. This looks a simpler proceeding than reflecting the flap as a preliminary measure, but in practice it is neither as simple nor as satisfactory.

In this proceeding the conjunctiva is ballooned as in the previous cases. The incision 1a is made through the conjunctiva with scissors as far as the fornix; through this incision the conjunctiva is separated from the sclerotic up to the fornix and as far round as 1b. Underneath this conjunctiva the knife is passed in at the limbus, the incision made as far as convenient, and completed with scissors. The capsule is scratched through this incision and the lens, or as much as possible, is negotiated through the opening 1a, no other opening than 1a, being made in the conjunctiva.

A modification of this flap is in Fig. III, in which the knife is driven through the conjunctiva and limbus, the cut made in the limbus and the incisions in the conjunctiva being made at the same time, 1a, and 1b, and the lens negotiated out as in the previous case.

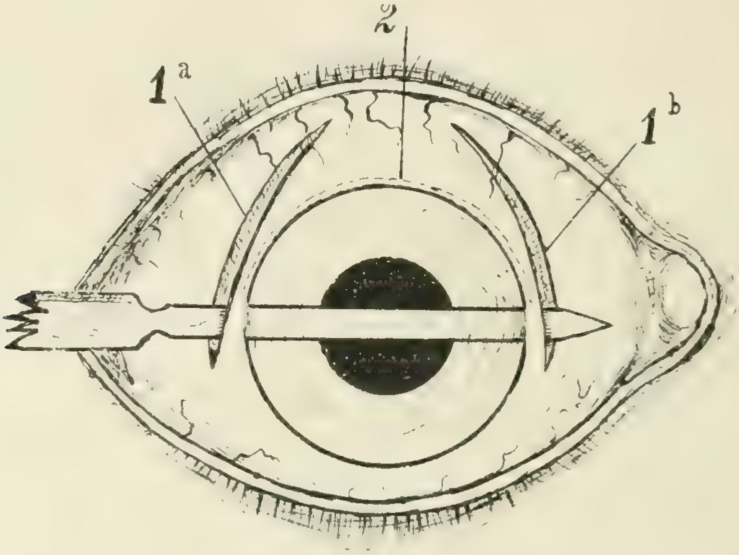

Fig. III.—Czermak's flap and modifications.

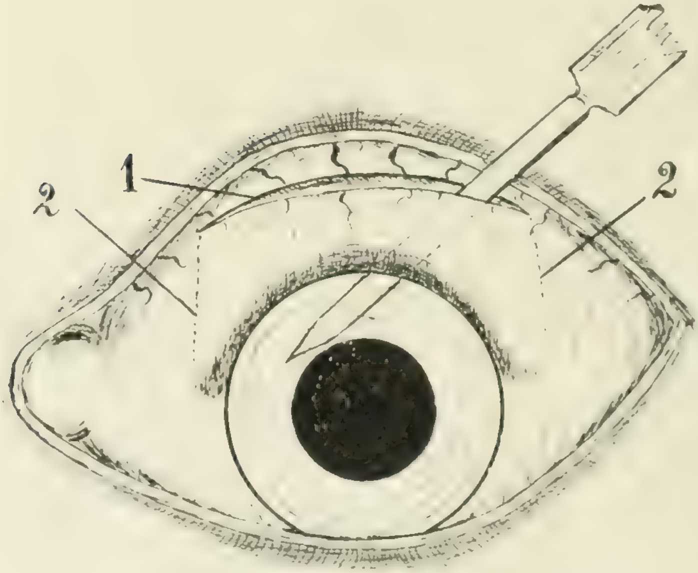

Fig. IV.

A further modification has been tried, as indicated in Fig. IV. An incision is made through the conjunctiva in the line 1, the conjunctiva is undermined as far up as the limbus and as far outward on each side as 2. An incision is made through the limbus underneath this flap, as far as convenient with the knife, and completed with scissors ; the lens is negotiated out underneath this flap.

Neither Czermak's flap, nor any of the above modifications of it, admit of intracapsular extraction. They do not allow space enough ; they are admissible only in the capsulotomy operation. They are tedious, thus trying the nerve of the patient in an extreme degree. A "chewed" wound, such as scissors make, in the limbus is objectionable for evident reasons. The use of scissors to make a wound in the limbus is a very difficult matter ; once the aqueous is liberated, the iris comes forward, and, when touched with scissors, as in this case is indispensable, causes the patient considerable pain. He, in consequence, winces, and renders the use of the scissors more difficult. The great drawback in Czermak's flap, or any of its modifications, is the difficulty of negotiating the lens through the opening, and of clearing the soft lens matter out of the eye.

To sum up the objections to all these flaps :—

1. The time spent on the operation is quadrupled, thus rendering a good patient a very troublesome one before the operation is finished.

2. The amount of astigmatism with conjunctival flaps is often very marked.

3. The traumatism in flap operations is trebled.

4. The difficulty of making the incision the correct size, except in Stanculeanu's flap.

5. The field of operation is obscured by blood and loose conjunctiva.

6. The increased difficulty in extracting the lens.

7. The increased difficulty in replacing the iris.

8. In intracapsular extraction the practical impossibility of dealing with burst capsules and other complications.

The advantages of conjunctival flaps :—

1. This operation claims to be followed by less sepsis, but this has by no means been proved by anything beyond an *ex-cathedrâ* opinion.

2. It claims that the conjunctival and sclero-corneal wounds heal more rapidly. The conjunctival wound does unite quickly, but in some cases it actually prevents the sclero-corneal wound from uniting.

3. Prevention of iris prolapse.—This I absolutely challenge. The cause of prolapse of iris is pressure on the exterior of the eye, and no flap can prevent this. It is better for it to be prolapsed and exposed than to be prolapsed under the conjunctiva, where it is more difficult to deal with.

In intracapsular extraction it has yet to be shown in large figures that less sepsis follows conjunctival flaps than is the case with the ordinary wound entering in the limbus and ending in the cornea.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—POISONING BY METHYL ALCOHOL.

Uhthoff, W.—Visual disturbances due to poisoning by methyl alcohol. (Beitrag zu den Sehstörungen durch Methylalkoholvergiftung.) *Klin. Monatsbl. f. Augenheilkunde*, January, 1915.

Uhthoff, of Breslau, describes in detail two cases of methyl alcohol poisoning with visual symptoms. They belonged to a group of two hundred workmen, who, among them, consumed about 40 litres of the alcohol from a cask which they "found" at a railway station. Fifty of them suffered from severe general symptoms, and of these, twelve died. It is not known whether those who died suffered from visual disturbances or not. Of the thirty-eight who lived, two had very serious disturbance of vision, six had slighter visual disturbance, with a relatively small central colour scotoma, while almost all the others had transient subjective visual symptoms with no visible ophthalmoscopic changes. In one case, with great loss of vision, there was pain accompanying movements of the eyes. No instance of true muscular paralysis occurred, but in one case there was slight limitation of the field of fixation towards the right side, and in five there were nystagmoid movements in lateral positions of the eyes.

The details of Uhthoff's two cases are as follows :—

Case 1.—This man drank two glasses of methyl alcohol, "neat," and three days later, began to suffer from giddiness, vomiting, abdominal pains, and sweating. At the same time there was dimness of vision, rapidly increasing to total blindness in twelve hours. The general disturbance passed off, leaving the blindness. Pupils were medium, and gave no light reactions. Accommodation was paralysed. There was slight blurring and pallor of the discs. Absolute blindness persisted for eleven days, after which there was gradual improvement, until, sixteen days later, V.R. was "fingers at 0·5 metre" and V.L. "fingers at 0·75 metre." The vision was eccentric. The discs remained atrophic and sharply defined, and the vessels narrow.

Case 2.—The patient drank about 40 cc. Next day there was dizziness, fever, abdominal pain, headache, tiredness, fluttering before the eyes, etc. Dimness of vision came on and progressed, until in five days there was almost total blindness. Eight days later, he could count fingers eccentrically. The discs were blurred. After four weeks, V.R. was 6/60, V.L. 6/24, and in another week V.R. 6/8 and V.L. 6/6. The field was filling out, but a relative central scotoma remained, and there was pallor of the temporal half of the disc.

A. J. Ballantyne.

II.—EYE DISEASE IN THE NEAR EAST.

1 **Nasr Farid.—Ophthalmia in Cyrenaica. (Les Ophtalmies en Cyrénaique.)** *Ann. d'Oculistique*, septembre, 1914.

(2) **Ticho, A.** — **Vernal catarrh in Palestine.** *American Journal of Ophthalmology*, September, 1915, from *Klin. Monatsbl. f. Augenheilk.*, Vol. LIV, p. 510.

(3) **Friedenwald, Harry.** – **The ophthalmias of Palestine.** *Transactions American Ophthalmological Society*, Vol XIV, part 1, 1915, p. 264.

(1) **Nasr Farid,** of Mansourah, Egypt, had an opportunity of collecting statistics as to the eye diseases prevalent among the Bedouins, while attached to the Egyptian Red Cross service during the Turco-Italian war in 1912. He finds that the chief causes of blindness are the ocular complications of small-pox and accidents with fire arms. Infectious ophthalmias are rare, but 79 per cent. of the population suffer from trachoma. Purulent ophthalmia presents the same proportions as in Egypt. Cataract and glaucoma are rare. Myopia does not exist. Retinoscopy showed that 115 out of 116 individuals examined were hypermetropes, the remaining one being emmetropic. R. J. COULTER.

(2) **Ticho,** of Jerusalem, prefaces his communication upon "Vernal Catarrh in Palestine" by remarking that statistics of diseases of the eye in that country differ considerably from European figures. The difference is due to endemic trachoma, the appearance of summer epidemics of Koch-Weeks' ophthalmia and of extra-genital gonococcus conjunctivitis; add to this the rarity of scrofulous and syphilitic affections of the eye, and we have quite a peculiar distribution of eye disease in Palestine.

As regards vernal catarrh, among 16,790 patients from Jerusalem and its neighbourhood, seen from July, 1912, to February, 1915, Ticho found 26 cases—that is, 0·155 per cent. All but 5 occurred in Arabs or Spaniols. The disease is usually at its height in August and September. The youngest patient was aged 4½ years, and the oldest 25 years. More than half were between 9 and 13 years of age. 92·31 per cent. of the cases were in males. Practically all the patients were of lymphatic habit, pale, and had swollen glands in the neck. As to the particular type of disease, there was 1 case of the bulbar form, 21 of the palpebral form, and 4 of the mixed form. The disease was found in combination with trachoma in 3 out of the 26 cases.

As treatment, Ticho speaks very favourably of the air-tight clear glasses recommended by Bayer (*Klin. Monatsbl. f. Augenheilk.*, Vol XXI, 1, 1913).
SYDNEY STEPHENSON.

(3) **Friedenwald,** of Baltimore, reports upon the "Ophthalmias of Palestine," the work being based upon two recent visits to that country.

He commences by briefly describing the ophthalmias of Egypt, and concludes that they are much more severe, especially the acute forms, than those met with in Palestine. His information with regard to Egypt is mainly derived from the reports of A. F. MacCallan, Director of the Ophthalmic Hospitals of Egypt.

Friedenwald devotes thirteen pages to an account of what has already been written on the ophthalmias of Palestine. The work of Theodor Germann (1896), T. Harrison Butler (1907), M. Krinkin (1913), E. Auerbach (1913), A. Feigenbaum (1914), and A. Ticho (1914), is all passed under review.

The author spent six weeks in 1914 in various cities, towns, and villages of Palestine, and during that time examined a large number of patients and the scholars of many schools. He also examined the cases at the British and the Jewish Ophthalmic Hospitals at Jerusalem.

His conclusions may be stated somewhat as follows.—Isolated cases of vernal conjunctivitis, usually associated with trachoma, were seen in various parts of the country. The common manner of carrying infection is by hands, clothes, dirty washing, utensils, and flies. Friedenwald surmises that the reason for the rare occurrence of phlyctenular ophthalmia may be the out-of-door life led by the natives. Chronic angular conjunctivitis is frequent and commonly associated with trachoma. The acute ophthalmia met with in Palestine frequently leads to destruction of the cornea. This is probably to be accounted for by malnutrition, ignorance, and the poor care taken of the patients. Certain epidemics were uncommonly destructive to the cornea. The Koch-Weeks' bacillus is the organism most frequently found in acute epidemic ophthalmia in Palestine. Ophthalmia neonatorum, due to the gonococcus, is unknown. Friedenwald believes that the gonococcus was probably the cause of the very malignant epidemics of acute ophthalmia referred to above.

The prevalence of trachoma appears to be in direct ratio to the unhygienic conditions under which the inhabitants live. The author's figures for schools outside Jerusalem varied from 8 per cent. to 85 per cent., with an average of 54 per cent. It was estimated by Auerbach that two-thirds of all cases originate in early childhood. Friedenwald saw well-marked trachoma in infants of five and six months of age. There was in the young a relative absence of complications as regards the cornea, the eyelids, and the lacrymal sac. For example, among upwards of 1,000 children examined by Friedenwald, pannus was met with on five occasions only in those under thirteen years of age. Furthermore, the trachoma of children often showed a definite tendency towards spontaneous cure, and responded readily to treatment. As regards trachoma in the aged, it often leads to degenerative changes in the conjunctiva, resulting in minute cystoid collections containing colloid, calcareous, or purulent material. These are a possible source of danger in operations on the eye. Another peculiarity of trachoma in the aged lies in the development of a marked thickening of the conjunctiva, without the presence of granulations, but with chronic discharge and irritation. SYDNEY STEPHENSON.

III.—RETINITIS OF PREGNANCY.

Fisher, J. Herbert.—Retinitis of pregnancy. *Proceedings of Royal Society of Medicine: Section of Ophthalmology*, July, 1915, page 127.

The important paper by **Fisher,** of London, is by no means easy to condense in the form of an intelligible abstract, and it should be read in the original.

An effort may be made to place his principal points before readers in the following manner:—

(a) The disease should be called Retinitis of Pregnancy, and not Albuminuric Retinitis of Pregnancy; or, better still, it should be called Toxæmic Retinitis of Pregnancy.

(b) The acute retinal changes are not the result of albuminuria and kidney disorder. Albuminuria is an effect not a cause of the trouble.

(c) Obstetricians now recognise that albuminuria of pregnancy, eclampsia, and pathological vomiting of pregnancy, are attributable to toxæmic products in the circulation. The toxæmia is something *sui generis*, its effects are found especially in the quality of the blood and in the blood-vessel walls.

(d) Such a toxæmia is surely the primary cause of the retinitis of pregnancy, a condition of the retina totally different in its onset, and usually in its appearances, and certainly in its sequel from what we know as "albuminuric retinitis."

(e) As regards the nature of the toxin. Many obstetricians have called the poisons syncytio-toxins, *i.e.*, the products of disordered disintegration of the syncytium cells. The syncytium cells are the product of the fœtus and connect the fœtal and maternal structures. These annectant cells cover the chorionic villi everywhere. Having performed their duty as annectant cells the syncytium cells in process of time disappear and no remains of them are demonstrable in the adult placenta. The products of their disintegration are discharged into the maternal blood stream. If their disintegration is normal, no disturbance to mother or fœtus results; but if their katabolism is perverted, the syncytium cells give rise to the toxæmia of pregnancy, which results in fatal eclampsia. As this poison is not always present in sufficient dose to kill the mother, other severe disorders may arise, such as the pathological vomiting of pregnancy, non-fatal convulsions, albuminuria, and toxæmic retinitis.

Nine case histories are then related. The author considers that good recovery of vision is the rule, accompanied by disappearance of all acute manifestations in the retina. In this respect, the cases differ from ordinary renal retinitis cases. Where defects of vision are permanent they seem to depend chiefly upon changes in the walls of the retinal arteries or on an atrophic condition of the nerve, which, if it be an ascending atrophy, may well be secondary to changes in the ganglion cells resulting from imperfect blood supply. The patients may live for many years. The author makes the very important point, from the standpoint of prognosis, that a recurrence of retinitis is by no means necessary, perhaps not even probable, if subsequent pregnancies take place. That is to say, that if the process of disintegration of the syncytium cells in subsequent pregnancies is carried out in a normal physiological manner, no additional toxins will be poured out into the maternal circulation. But to arrive at a conclusion it would be necessary, with the aid of the obstetricians, to consider all the diseases attributable to the toxæmia of pregnancy, and not to deal with the retina alone.

In the discussion which followed, **Hosford,** of London, took up the question of the prognosis as to life. He had been much struck by the fact that out of sixteen cases carefully observed during fifteen years, only three were now alive. All the cases, except two, ultimately developed a star at the macula, and that he regarded as a very important point in diagnosis, and as an indication of a likely fatal termination.

Rockliffe (Hull), **Attlee** (London), **Lawford** (London), and **Paton** (London) also took part in the discussion. ERNEST THOMSON.

IV.—THE SUBCONJUNCTIVAL INJECTION OF INORGANIC SALTS.

Bader, A.—Subconjunctival injections of inorganic salts and the dissociation theory. (Die subkonjunktivalen unorganischen Salzinjektionen und die Dissoziationstheorie.) *Zeitschrift für Augenheilkunde*, January-February, 1915.

Bader, of Basle, first gives an historical retrospect of the opinions which have been held to explain the action of subconjunctival injections of solutions of inorganic salts. It would seem that Rothmund made a subconjunctival injection of a hypertonic solution of sodium chloride in 1866. It was given as a substitute for Pagenstecher's ointment, in order to clear up the nebulæ left by interstitial keratitis. The second part of the paper, the theoretical part, seeks to explain the action by the dissociation theory of solution, which we owe to Arnheims, who first suggested that an electrolytic solution of a salt contained not only complete molecules of that salt, but also dissociation groups, the so-called ions. The ions are either kathions or anions. If the solution be very dilute, the salt is wholly dissociated into ions. Such a solution rich in ions is chemically active, and is able to act upon the tissues in various ways. A solution of such a substance as cane sugar does not dissociate, the liquid contains neither kathions nor anions, but only molecules. It is therefore inactive. Another example which occurs to the reviewer is to be found in the relative potency of silver nitrate, protargol, and argyrol. The last product is relatively inert. It contains a very high percentage of silver, but its solution is not an electrolyte ; on the other hand, the solutions of protargol and silver nitrate are highly ionised, and their therapeutic action is great.

Poulsson has shown that the active ion is that which is the most foreign to the tissue. For example, the blood and lymph are rich in sodium, so sodium salts have a feeble ionic action, and act by exciting the purely physical phenomenon of esoriasis ; they are chemically indifferent. Mercurial salts, on the other hand, are foreign to the body, and exert a powerful ionic action. For this reason they have many disadvantages when injected subconjunctivally, causing pain and inflammatory reaction. The salts of potassium stand midway between the two, and in consequence Bader undertook the experimental investigation of their action. On his index he noted their general action upon the eye, their effect in stimulating the elimination of Indian ink from the eye, and, lastly, the influence they exerted upon the albumin content of the aqueous humour.

He found that subconjunctival injections of the neutral potassium salts were well tolerated by the eye of the rabbit. In comparison with injections of normal saline, they cause slight injection, blepharospasm, and miosis, symptoms which disappear in twenty-four hours.

Both sodium and potassium salts accelerate the absorption of Indian ink from the eye, but the potassium salts act more rapidly.

Both salts increase the albumin content of the aqueous, but the action of potassium salts is 10-14 times greater than that of the sodium salt. The difference is much less when dead eyes are employed.

T. HARRISON BUTLER.

V.—SYPHILITIC AFFECTIONS OF THE EYE.

1 Boas, Harald, and Ronne, Henning.—Investigations with regard to family syphilis in parenchymatous keratitis. (Untersuchungen uber familiare Syphilis bei parenchymatoser Keratitis.) *Klin. Monatsbl. f. Augenheilkunde*, February, 1914.

2 Igersheimer, J. Disease of the lacrymal passages in hereditary syphilis. (Ueber die Erkrankung der tranenabfuhrenden Wege bei hereditärer Lues.) *Klin. Monatsbl. f. Augenheilkunde*, February, 1914.

(1) **Boas** and **Rönne**, of Copenhagen, as a result of the application of the Wassermann test to thirty-three families, members of which suffered from parenchymatous keratitis, came to the following conclusions:—

1. That patients suffering from parenchymatous keratitis often have apparently healthy brothers and sisters, who nevertheless give a positive Wassermann reaction. These should be sought for with a view to prophylactic specific treatment.
2. The inheritance of the syphilitic infection is very irregular. The birth of apparently sound children is no guarantee that subsequent children will be free from the disease. A. J. BALLANTYNE.

(2) This paper constitutes the tenth of a series of contributions on syphilis and the eye by **Igersheimer**, of Halle. Its main purpose is to show that disease of the lacrymal drainage apparatus in children from two to fourteen years of age is very often due to hereditary syphilis, or at least occurs in the subjects of that disease. This was true of at least fifty per cent. of the cases between these ages which came under his observation. The fact is in striking contrast with the observation that acquired syphilis very seldom causes disease of the lacrymal passages.

Blennorrhœa of the lacrymal sac in the new-born has, as a rule, nothing to do with syphilis.

A. J. BALLANTYNE.

VI.—TUBERCULOUS AFFECTIONS OF THE EYE.

(1) **Leboucq.—Some remarks concerning tuberculous cyclites. (Quelques remarques à propos de cyclites tuberculeuses.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) **Shahan, W. E.—A case of ocular tuberculosis with notable astigmatic variations.** *American Journal of Ophthalmology*, June, 1913.

(3) **Morax, V. and Landrieu, M.—Primary tuberculous lupus of the eyelids and Meibomian glands. (Lupus tuberculeux primitif des paupières et des glandes de Meibomius.)** *Ann. d'Oculistique*, octobre, 1913.

(4) **Knapp, Arnold.—On some forms of retinal tuberculosis.** *Archives of Ophthalmology*, November, 1913.

(5) **Libby, George F.—Tuberculosis of the bulbar conjunctiva.** *Trans. American Ophthalmological Society*, Vol. XIII, Part iii, 1914, p. 784.

(6) **Bell, George Huston.—Report of a case of tuberculosis of the sclera of probable primary origin.** *Ibidem*, p. 787.

(7) **Luedde, W. H.—Ocular tuberculosis in relation to the nose and throat.** *American Journal of Ophthalmology*, October, 1914.

(8) **Mayou, M. S.—(?) Tubercular mass in the nerve sheath.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIV, p. 180, 1914.

(9) **James, Rutson.—(?) Massive tubercle of the iris.** *Trans. Ophthalmological Society U.K.*, Vol. XXXIV, 1914, p. 150.

(10) **Eason, H. L.**—**Case of confluent tubercle of the iris.** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, December, 1914, p. 8.

(11) **Prisco, Achille.**—**Tuberculoma of the conjunctiva. (Sul tubercoloma della congiuntiva.)** *Archivio di Ottal.*, Luglio, 1915.

(12) **Tooke, Frederick.**—**Tuberculous meningitis, with special reference to the tubercle of the choroid and its pathologic manifestations.** *Trans. American Ophthalmological Society*, Vol. XIV, Part i, 1915, p. 218.

(13) **Jackson, Edward.**—**Intra-ocular tuberculosis.** *Ophthalmic Record*, January, 1916.

(1) **Leboucq**, of Ghent, analysed five cases localised to the ciliary body without lesions of the iris, all of tuberculous origin. The beginning was sudden. There was feeble ciliary redness, with slight central corneal dulness and dotting on Descemet's membrane These dottings became larger and soon formed a classic Descemetitis. The regression of these spots began at the end of a fortnight, and lasted for several months. The spots are due to small cellular masses from the inflamed ciliary body which become deposited upon the endothelium The products of the cellular disaggregation penetrate into the deeper layers of the cornea and attract leucocytes; the precipitations become transformed into brown spots made up of grains of pigment. These lesions are followed by flakes in the vitreous body, where they are not very mobile, and then at the end of a variable period, the media become transparent.

Treatment by tuberculin does not appear to influence this disease at all.

MARCEL DANIS.

(3) **Morax and Landrieu,** of Paris, record the case of a man, aged 20 years, who consulted them on account of a painless slowly progressive lesion of the eyelids of the right eye of about a year's duration, consisting of small rose-coloured glandular elevations with white centres, grouped in two principal masses, one on each eyelid near the external canthus, that on the lower lid being the larger. The masses were rough; there was no adhesion to the deeper structures; but on palpation, slight thickening was felt involving the tarsus. Two months later, the lesions had reached the free border of the eyelids, and there was a chalazion below the one on the lower eyelid. The patient was seen by a dermatologist (Dr Brocq), who diagnosed the condition as either lupus or cancer, probably the former, and advised free excision. This was performed, the gap in the eyelids being covered by pedunculated flaps. Microscopic examination and inoculation experiments showed that the lesions were of a tuberculous nature. The patient's family and personal history were good, and no trace of any other tuberculous lesion could be found. Although lupus of the eyelids secondary to disease of the nose and lacrymal passages is common, there are only two other cases on record in which it occurred as a primary lesion, and the diagnosis was not clearly established in either of them.

R. J. COULTER.

(4) **A. Knapp**, of New York, reports two cases in which the tuberculous process was localised in the superficial layers of the retina. In one case, that of a man of 19 years, the left eye was normal, but in the right eye the disc was swollen, with a few patches of white exudation near or adjoining it. There was one small hæmorrhage on the disc, and a star-like radiate figure at the macula. Vision was 5/200. The reaction to tuberculin was positive, and included the appearance of a crop of small white exudates about the

disc. Resolution followed a regular treatment with tuberculin in about three months. Vision became 15/200, but a central scotoma remained. The other patient, aged 22 years, had a normal left eye, whilst the vision in the right eye was 8/200, and there was a white exudate along a macular vein with two small hæmorrhages. Tuberculin injection gave a positive reaction, and under tuberculin treatment the process at first increased, showing exudates, hæmorrhages, and vitreous opacities, but it ceased to extend in six weeks, and resolution occurred after five months of treatment, with vision 18/200 and central scotoma. In the first case the process was always superficial; in some places, in the second case, extension to the choroid took place, but not so much as to cause the usual proliferation of pigment. ROSA FORD.

(5) A woman, 40 years of age, whose case is reported by **Libby,** of Denver, suffered from a slight right apical phthisis, a bunch of enlarged glands on the right side of the neck, and a number of small, pale, firm, reddish-white nodules situated in the ocular conjunctiva covering the inner part of the right eye. The glands had become apparent a month before anything was noted amiss with the eye. The ocular infection, on the whole, was believed to be secondary. Tubercle bacilli were not found in smears or scrapings made from the conjunctival lesions. A focal reaction, however, was obtained upon more than a single occasion after the injection of tuberculin. As regards treatment, in addition to the systematic use of tuberculin, the affected conjunctiva was treated by exposure to sunlight. At first, exposures were made for ten seconds, but before long, they were lengthened to sixty-three seconds repeated from two to six times a day. On two occasions, whilst under the treatment, the conjunctiva became intensely inflamed, necessitating a suspension of the applications for a week or so. The final result was good.
SYDNEY STEPHENSON.

(6) **Bell**, of New York City, found several hard, dark-red, or violet nodules in the sclera, not far from the limbus, of one eye of a woman, aged 20 years. The injection of 0·00004 gm. of T. B. emulsion produced local, focal, and general reaction. The condition was one of deep diffuse scleritis, of tuberculous nature. After twelve injections of tuberculin, the parts were less inflamed, but the cornea was infiltrated at several points. A chamois leather-like nodule then lay at the limbus, and spreading from this to the outer canthus was an area of inflammatory thickening and injection. At a somewhat later stage, there was evidence of slight irido-cyclitis, and the periphery of the cornea showed round *plaques* of interstitial infiltration. After treatment with tuberculin spread over about six months, V.=20/15, some peripheral opacities were present in the cornea, and the scleral infiltration had been replaced by a slate-coloured cicatrix. The pupil was regular, and the eye was free from pain or redness. It should be added that the patient's lungs were free from disease; that her family history was good; that her tonsils were not enlarged; that tubercle bacilli could not be found in the sputum; and, finally, she was well-nourished.

The case is regarded by the author as one of primary tuberculosis of the sclera.

The patient had fifty injections of tuberculin. Bell has never seen any bad result from this method of treatment, which, in his opinion, may be said to constitute "a real and great therapeutic progress."

Discussion.

Weeks, of New York, expressed a doubt whether sunlight had much to do with the recovery of Libby's patient. Tuberculin alone was competent for the purpose.

Pyle, of Philadelphia, mentioned a case where the first sign of improvement began immediately after the injection of diphtheria antitoxin.

A. E. Davis, of New York, alluded to Herman Knapp's famous case where primary tuberculosis of the conjunctiva followed an operation for squint.

Theobald, of Baltimore, enquired whether either of the authors had found the tubercle bacillus in the inflamed parts. SYDNEY STEPHENSON.

(7) The suggestive article by **Luedde**, of St. Louis, is concerned mainly with the possibility that ocular tuberculosis may originate from the nasal and pharyngeal cavities in the absence of any demonstrable tubercle elsewhere. Further, the author considers it likely, in cases where pulmonary tuberculosis is known to exist and where the eye is affected later, that the infection is first carried to the nasal accessory sinuses in coughing, etc., and thence to the eye. It seems more likely, Luedde thinks, that infection of the eye comes about in this way than through the general circulation. If tubercle bacilli are carried into the general circulation in such amount that some of them are likely to strike the eye, we may expect their development in many other tissues of the body, producing a general miliary tuberculosis and a fatal result. Many cases of ocular tuberculosis show none of these serious general symptoms, so that we may assume that the infection has reached the eye in some such manner as that indicated—for example, by way of the nose and throat, rather than through the general circulation as a direct metastasis from the lung. To confirm this view, experiments were made on rabbits, but up to the moment are not considered to be sufficiently extensive to be conclusive. Several cases are related, one in particular at considerable length, tending to prove the theory from the clinical standpoint.

ERNEST THOMSON.

(8) In the case reported by **Mayou**, of London, there seemed to be no obvious cause of a typical œdematous appearance, such as is seen in albuminuric retinitis. The patient was a female, aged 26 years. From the fundus appearance it was thought that the condition must be due to some local pressure on the central retinal vein. At the patient's next visit, some episcleral nodules had appeared. von Pirquet reaction was found markedly positive. Examination of one of the episcleral nodules showed typically tuberculous tissue. The patient was placed upon increasing doses of tuberculin T.R. Almost immediately, the condition began to clear up. The history and the clinical appearance strongly suggested that a ring of tuberculous nodules, similar to those about the limbus, may have been deposited in the nerve sheath near the nerve head, pressing on the central retinal vein, and causing the venous obstruction and vascular disease of the fundus.

ERNEST THOMSON.

(9) Essential facts of the case by **R. James**, of London, were as follows:—

A healthy looking lad (age not stated) showed fairly gross precipitates on the lower part of one cornea, a couple of brownish granulomatous masses arising from the iris, and a single posterior synechia in connection with one of the latter. The Wassermann and the von Pirquet reactions were both negative. No evidence of pulmonary phthisis. There was an enlarged gland in the posterior triangle of the neck. V.=6/5. SYDNEY STEPHENSON.

(10) The chief point in this case of confluent tubercle of the iris by **Eason**, of London, seems to be that the condition progressed despite three injections of new tuberculin (0·0002mg.). When the lad was exhibited at the Royal Society of Medicine, the growth had infiltrated the sclera, and commenced to perforate the globe in the ciliary region. SYDNEY STEPHENSON.

(11) The group of cases, first collected by Eyre, of this condition, is still not a large one. **Prisco**, of Naples, adds a typical example.

HAROLD GRIMSDALE.

(12) The first part of this communication by **Tooke**, of Montreal, is largely concerned in the attempt to refute Marple's views, namely, that tubercle of the choroid, if looked for in the proper way, may be found in all cases of tuberculous meningitis at some stage of the disease. In this attempt, Tooke cannot truthfully be said to have been convincingly successful. The investigations were made at the Royal Victoria Hospital, Montreal, on 102 patients, whose ages ranged from one to sixty years, upwards of 50 per cent., however, being under fifteen years. It is to be assumed, although the fact is not unequivocally stated, that all were suffering from tuberculous meningitis. According to Tooke's own showing, the examination of the eyes was carried out in some instances by members of the medical staff (presumably the physicians or the surgeons), and in a few by the resident staff. Only too frequently patients were examined a considerable time before death—that is to say, at a period when the incidence of choroidal tubercle is admittedly nothing like so great as later in the history of the case. It is difficult to get at the precise facts, but one point emerges :—that of 73 cases examined by "members of the attending staff" (whatever that may mean) choroidal tubercles were found in seven instances, or 9·58 per cent. Contrast with these somewhat crude methods those employed by Marple, who, working under the old conditions (apparently not very different from those employed by Tooke), found only 4 per cent. or 5 per cent. of choroidal tubercle in babies affected with cerebro-spinal meningitis. Marple then made his examinations much more frequently and employed an electric ophthalmoscope for the purpose, and supplemented the number of examinations by enlisting the interests of the resident doctor in the work. Under these conditions, in a series of thirteen cases, he found tubercle of the choroid in every one.

The second part of Tooke's communication is devoted to the pathology of (*a*) tuberculous meningitis, and (*b*) tubercle of the choroid. Choroidal tubercles vary in size from 0·5 mm. to 2 mm., and they occur, as a rule, in posterior hemisphere of the eyeball, near the bifurcation of the larger retinal vessels. The first sign of a tubercle is to be seen in the engorgement of a vein or capillary, with migration of leucocytes, so that in due course a condition of perivasculitis comes about. Changes take place in the vessel itself, having for their effect the cutting off of the blood supply, and this may be brought about by (1) pressure by the inflammatory exudation, (2) hyperplasia of the tunica media of the vessel, and (3) endarteritis obliterans. There is a coincident infiltration by fibroblasts, and doubtless should the lumen become completely occluded, caseation would ensue. The formation of giant cells, however, does not necessarily imply caseation. The author notes the close association of the tubercles with the vascular elements of the eye. In his experience, the pathological changes are invariably included between Bruch's membrane, on the one hand, and the sclera, on the other. Tooke has never seen the least evidence of infiltration between the lamina vitrea and the retina. The pathological portion of the paper is illustrated by six micro-photographs. SYDNEY STEPHENSON.

(13) **Jackson**, of Denver, has a thoughtful article on tuberculosis of the eye, which will well repay perusal in the original.

The ophthalmologist has been too apt to regard tuberculosis as a condition mainly outside of his special province, and this, as Jackson, points out, has given a false point of view and developed error. Laennec's work made tuberculosis almost synonymous with pulmonary phthisis, and even yet causes things that are true only of the lung cases to be regarded as characteristic of the tuberculous process in general. For example, there is still a tendency to look with doubt upon the tuberculous character of lesions of the eye, unless tuberculous processes are at the same time evident in lymphatic glands, lungs, or other parts of the body, or some of the supposed general symptoms of tuberculosis, such as wasting or fever, are recognised. As to the diagnosis of tuberculosis of the eye, there has been a disposition to base such upon the finding of the tubercle bacillus. The bacilli may doubtless be readily found in developing miliary tubercle, but the exact reverse is the case in chronic lesion. "The failure to find bacilli in case of chronic intra-ocular tuberculosis, then, scarcely raises any question of doubt regarding the diagnosis." Again, the tuberculin tests cannot be absolutely relied on. The injection of old tuberculin is probably the most trustworthy, especially if the general is accompanied by a focal reaction. A single injection, however, is not enough.

Miliary tubercles of the choroid are found only in tuberculous meningitis and generalised miliary tuberculosis as a terminal condition. They are not of great practical importance, except in so far as they may help to settle a doubtful diagnosis. Before these early tubercles run their course, the patient usually dies, but there is no reason to suppose that under contrary circumstances, they may not go on to the formation of cicatrices in the choroid. Although they do not then represent the ordinary ophthalmoscopic picture of tubercle of the choroid, the final appearance is that of choroidal atrophy with more or less pigmentation. There is every reason to accept as correct the view that tuberculosis is a common cause of chronic choroiditis and of choroidal atrophy.

It is probably too much to assume that recurring hæmorrhage into the vitreous and retinitis proliferans in young persons are always due to tuberculosis. But the discovery of tubercle bacilli in some of the retinal lesions, and the characteristic tuberculous structure in others, the reaction to tuberculin, and, finally, the cure of cases by tuberculin treatment, come "as a revelation in a very obscure field of ocular pathology."

Jackson suggests that some of the cases described as "massive exudation into the retina" may be of tuberculous nature.

With regard to treatment, in cases of intra-ocular tuberculosis we should adopt an outdoor life. This may be done with facility in such cases, since the good general condition of the patient usually makes it simple to secure the benefits of good food and fresh air. The specific treatment should be to give small doses of tuberculin at comparatively long intervals, say, one to four weeks.

SYDNEY STEPHENSON.

VII—INJURIES OF THE EYE IN WAR.

(1) Pálich-Szántó, Olga.—The origin of traumatic macular affections. (Beitrage zur Entstehung der traumatischen Makulaerkrankungen.) *Klin. Monatsbl. f. Augenheilkunde*, January, 1915.

(2) Elschnig.—War injuries of the eyes. (Kriegsverletzungen des Auges.) *Med. Klinik*, May 16th, 1915, abstract in *Universal Medical Record*, November, 1915.

(3) **Rollet, E., and Mangini, L.—Lesions of the deep membranes of the eye with integrity of the eyeball in wounds of war. (Lésions des membranes profondes de l'œil par blessures de guerre avec intégrité du globe.)** *Lyon Chirurgical*, 1^{er} octobre, 1915.

(4) **Wirgman, C. Wynn.—Ophthalmic notes in a general hospital in Egypt.** *Lancet*, November 27th, 1915.

(5) **Evans, J. Jameson.—Organic lesions from shell concussion.** *British Medical Journal*, December 11th, 1915.

(6) **Bennett, F. D. — Bilateral iridodialysis with amblyopia and contracted fields due to exploding shrapnel.** *British Medical Journal*, December 11th, 1915.

(7) **Oliver, M. W. B.—Optic neuritis in gunshot wounds of the skull.** *British Medical Journal*, December 18th, 1915, p. 905.

(8) **Clarke, Ernest.—Some rare ophthalmic "war" cases.** *Medical Press and Circular*, December 29th, 1915.

(9) **Hertz, Arthur F. and Ormond, Arthur W. — The treatment of "concussion blindness."** *Lancet*, January 1st, 1916.

(1) The patient, who came under the observation of **Pálich-Szántó**, of Budapest, received an injury in the right superciliary region from a rifle shot. The eyeball was not visibly injured, but there was sudden loss of vision. When seen five days later, there was an iridodialysis below, the anterior chamber was deep, and the media were clear. X-rays detected no foreign body. The lower border of the macular area was defined by a thin greyish line from which three branches passed downwards. There were some fine punctate hæmorrhages in the retina. Vision was 5/30, with a central scotoma, and great concentric contraction of the field. In the course of the following month, the fundus appearance underwent considerable change. Latterly, one saw a yellow patch, about the size of the disc, at the centre of the fundus.

The authoress remarks that the pigmentary and atrophic changes seen at the macula after contusion injuries may be a sequel of Berlin's œdema, or may result from a circumscribed hæmorrhage, with localised elevation of the retina. Hæmorrhage at the macula is not common in such cases. It always requires a severe injury, *e.g.*, shot, explosion, or blow on the eye. In her case she believes that there was a small hæmorrhage under or in the deeper layers of the retina. This led to a circumscribed flat elevation of the retina, with folding, and, in the later stages, to connective tissue organisation in the neighbourhood (retinitis proliferans). A. J. BALLANTYNE.

(2) **Elschnig**, of Prague, comments on the remarkable variety of the injuries of the eyes among the soldiers, and regrets that there is no time or opportunity to study and record all this ophthalmologic material. The first surprise was the discovery that in such a large proportion of cases the eyes had been defective to begin with. In two cases choked disc from a tumour in the brain was found in men who had been serving for weeks in the firing line. Only thirty-six cases of severe destructive injuries of the eyes reached his clinic, including three in which the bullet had passed through both temples, entailing total blindness. He has applied in three cases his method of substitution of the vitreous body in treatment of hæmorrhage in the vitreous, and the results were most gratifying. If this were done regularly and early, vision might often be saved, or at least the shape of the eyeball retained in many cases otherwise doomed. He reiterates, in conclusion, that specialist

examination and care are particularly necessary in the minor injuries of the eyes, especially from a passing projectile or minute foreign body in the eye. He encountered a host of injuries of this kind which were easily recognised, and vision was saved by proper treatment ; but he also had many cases of the kind in which the time for proper treatment had long passed before they reached an ophthalmologist, and irreparable lesions and blindness were the consequence. The necessity for a consultant ophthalmologist at all the stationary hospitals near the front is apparent from these experiences. He even suggests that the management of the hospital might be held responsible for damages for blindness resulting from omission of the necessary minor ophthalmologic measures required.

(3) Everybody knows that wounds of the head and face are now more frequent when trench fighting is the rule than they were at the beginning of the war. For example, in August, 1914, Rollet, of Lyons, had among 516 wounded only 5 per cent. of injuries of the face, while in January, 1915, the percentage of those injuries had risen to 13.

In the present communication **Rollet** and **Mangini,** of Lyons, direct particular attention to the class of case where serious damage is done to sight, although to all outward seeming the eyes show no signs of mischief. Such a condition has accounted for 6 per cent. of the wounded eyes examined by the authors, who have collected 96 such cases all told. They describe the lesions under the several heads of : (1) retinal detachment (17 per cent.) ; (2) fibrous *plaques* due to reattached retina (17 per cent.) ; (3) choroidal rupture (22 per cent.) ; and (4) retro-choroidal hæmorrhage and consecutive lesions (34 per cent.). The injuries described are illustrated by twenty-four coloured figures, which if they perhaps leave something to be desired from an artistic point of view, at least give one an excellent idea of the nature of the ophthalmoscopic lesions they are intended to represent. By the way, Rollet and Mangini insist upon the necessity of distinguishing the *plaques* of traumatic choroido-retinitis from those due to some general cause. In order to effect this, they seem to depend upon a careful history, and lay stress on going carefully over the ophthalmoscopic field for the purpose of finding some not doubtful associated lesion, such as a choroidal rupture. The evolution of hæmorrhages or of ruptures of the retina or choroid terminates in a cicatricial and stable condition. It thus appears that the prognosis of these injuries should improve little by little, but they have seen several cases where the visual acuity progressively diminished from progressive atrophy of the optic disc, due to a peripapillary fibrous proliferation. Treatment, then, is merely expectent. Finally, the authors have failed to establish any relationship between the bullet or fragment, or what not, that was responsible for the injury and its power of penetration, or with the lesions in the fundus oculi caused by its wound.

SYDNEY STEPHENSON.

(4) **Wirgman**, R.A.M.C. (T.), who was for a time in charge of ophthalmic wards in a hospital in Egypt, saw a number of serious injuries of the eye and orbit, some of which are here described. Wirgman makes the remark that among those who came to him were some who had such high refraction errors that it is a matter of surpise that they had ever been passed as fit for service. That this is certainly the case is proved by his record of some of these errors. One man had five dioptres of myopic astigmatism in each eye, in addition to spherical errors of 3 and 1 dioptre of myopia in the right and left eyes respectively.

ERNEST THOMSON.

(5) **Evans,** of Birmingham, draws attention to serious organic lesions of the eye resulting from shell concussion. In this connection he mentions

"holes" at the macula, ruptures of the choroid with intra-ocular hæmorrhage, and optic atrophy. A case is cited where grave intra-ocular changes came on in both eyes after the passage of a bullet through the left cheek, the left antrum, and the nasal cavities, emerging through the right zygomatic region. SYDNEY STEPHENSON.

(6) **Bennett**, of London, observed iridodialysis of each iris in a soldier, aged 37 years, three months after an injury to the eyes by shrapnel exploding in mud some four feet in front of him. The accompanying amblyopia (which improved) was thought to be due to commotio retinæ and functional disturbance. SYDNEY STEPHENSON.

(7) **Oliver** made a communication on "Optic neuritis in gunshot wounds of the skull" to the first meeting of a society which has been formed in a somewhat impromptu way among the military medical officers stationed in one of the hospital areas in France.

Oliver had examined the eyes of 68 men who had sustained gunshot wounds of the head, and in all of these cases the skull was fractured, as shown either by X-rays or by subsequent operation. The fracture invariably involved the vault, and in a few the base was also fractured. Of the total number (68), 31, or 45·59 per cent., showed optic neuritis. These cases of optic neuritis could be divided into two groups, (1) by far the larger, characterised by fulness of the retinal veins and blurring of the optic disc with but little swelling, and (2) marked swelling of the disc, sometimes associated with retinal hæmorrhages. Of the 31 cases of optic neuritis, 25 belonged to the first and 6 to the second class. All cases of the second group showed some signs of cerebral compression, and two of them proved, on operation, to be affected with cerebral abscess. Two of these patients were still alive, but one had a cerebral abscess and the other very extensive laceration of the brain. Vision might or might not be affected. In the slight cases the optic neuritis disappeared after any form of local treatment or even without any form of treatment. The vision was never compromised.

The cause of the condition was increased intracranial pressure, which was probably due to œdema of the brain due to the injury. In the author's view, it was not the outcome of sepsis. SYDNEY STEPHENSON.

(8) **Clarke**, of London, reports three cases :— (1) A man, whose vision was 6/9 and whose injured eye showed no signs of irritation, who yet had a fragment of a nickel bullet lodged superficially in the lens, to say nothing of a multitude of small pieces embedded in the cornea. (2) A case where one eye had been cleanly blown out of its socket by the explosion of a bomb. (3) A "concussion blow" from a bomb followed by intra-ocular hæmorrhage, sub-acute irido-cyclitis, and total detachment of the retina.

SYDNEY STEPHENSON.

(9) **Hertz** and **Ormond**, of London, contribute what may perhaps turn out to be an important page to the therapeutics of the War. These cases of "concussion blindness" are becoming quite well-known and their treatment is a serious problem. If all "operators," to use the only word which seems to be available, are as successful as the present writers (and one imagines that the individual "operator" is a large factor in the case), a long therapeutic step will have been taken.

The writers detail seven such cases in which patients who complained of complete or almost complete blindness, as the result of concussion injuries which seemed to have had no direct effect on the organs of vision, recovered varying degrees of vision as the result of hypnotic suggestion. The cases are given at length, including the description of the original injury. They should be read in the original by every ophthalmic surgeon, whether engaged in war work or not, since, after all, such cases are probably quite on all fours with cases of functional blindness met with in civil practice. If conditions like this arising from shock on the battle-field can be completely cured by suggestion, there does not seem to be any reason why those arising from other kinds of shock should not be cured in the same way.

ERNEST THOMSON.

VIII.—THE WASSERMANN REACTION.

Fönss, A. L.—The defects of Wassermann's reaction. *Ugeskrift for Laeger*, p. 1737, 1915. Abstract from *The Medical Review*, January, 1916.

The value of Wassermann's reaction is great, but it is apt to be slavishly and foolishly relied on to the exclusion of other methods of diagnosis. This has gone so far that some men dare not diagnose syphilis when the reaction is negative. It is not realised that Wassermann's reaction is merely an auxiliary to the diagnosis of syphilis, which must ultimately stand or fall by the clinical examination. The *technique* of the reaction is so complicated that it requires great skill and practice. In Denmark it is carried out exclusively in the State Serum Institute, and thus its exploitation in small uncontrolled private laboratories is avoided. In Germany, on the other hand, this test is made not only in innumerable university and hospital laboratories, but even in private practice. It is, therefore, not surprising that specimens of a patient's blood, sent at the same time for examination to various quarters, have given conflicting reactions. Thus, Frudenthal sent specimens of the same blood to four institutes in Berlin. In two the reaction was found to be negative, in a third it was doubtful, and in a fourth it was markedly positive.

Wassermann's reaction is not specific for syphilis, and it is positive in such protozoal diseases as framboesia. It is also positive in 50 to 80 per cent. of cases of lepra tuberosa. In certain other diseases, such as scarlatina, the cachetic stage of cancer and tuberculosis, in malaria and febris recurrens it is also occasionally positive. It may also be positive for a little time after the administration of a general anæsthetic. Certain digestive disturbances may also be sufficient to render it positive. There are probably still other factors likely to prove misleading. The margin of error in the diagnosis of syphilis is shown by the investigations of Bruch, who found among 5,028 control examinations, 59 positive reactions unaccompanied by any other evidence of syphilis. Examination of 1,927 non-syphilitic persons in Denmark yielded a positive reaction in five cases. Three of these patients had been recently anæsthetised, and the other two were suffering from scarlatina and leprosy respectively. The reaction may be temporarily positive in soft sore, particularly when it is accompanied by inguinal bubo. In such cases, considered in retrospect, there is little chance of the disease being mistaken for syphilis. But at the time when Wassermann's reaction is positive and the appearance of the ulcer is not altogether typical, the diagnosis of syphilis is hard to avoid. It may be argued that the examination for spirochætes in such a sore would solve the problem. Spirochætes can in most cases be found in a recent chancre; but, when the clinical picture is not altogether typical of chancre, there is a certain proportion of cases, particularly of gangrenous chancre and "chancre mixte," in which it is impossible to find spirochætes. Here Wassermann's reaction, if reliable, would be most valuable; but even if it is first negative and then positive, the diagnosis of syphilis is not established.

As a rule, Wassermann's reaction does not become positive till at least five weeks after infection; and it is seldom positive till a stage just previous to the outbreak of the rash. There are, however, certain important exceptions. For example, in the case of syphilis, beginning with a gangrenous chancre, the reaction does not become positive till late, and till secondary symptoms have developed. The reaction is very useful in cases of syphilis which has been latent for a long period. In one of the writer's cases a syphilide developed on the back of a patient in whom the disease had been completely latent for 40 years. In this case the reaction was markedly positive. A positive reaction in such a case shows that, in spite of decades of latency, the disease has not been cured. A negative reaction, on the other hand, does not imply the reverse; and it may soon be followed by a positive reaction and clinical symptoms of a relapse.

Wassermann's reaction is a valuable guide to the effect of treatment on a whole series of cases. Marcus has shown that it was positive in only 13 per cent. of all cases subjected to systematic, intermittent treatment. It was positive in 35 per cent. of all cases treated imperfectly, and in 81 per cent. of all totally neglected cases. It is never wise to be satisfied with a single reaction, particularly when the clinical evidence is scanty and inconclusive. In the best of laboratories specimens for examination are liable to be mixed. The following cases show how a single reaction may be misleading.

A woman, aged 38, had suffered from suppurating glands in the neck at 20. There was no history of syphilis. About six months earlier she began to develop small ulcers and nodules symmetrically distributed over the cheeks and nose. Pressure with a glass slide failed to reveal the characteristic features of lupus. There was a perforation of the septum of the nose, of about the size of a nut, and both conchæ were covered by a profuse growth of granulation tissue. As the diagnosis was obscure, the blood was examined by Wassermann's reaction, and injections of tuberculin were given. On July 18 Wassermann's reaction was markedly positive, but on July 28 and 31, and on August 4 and again on September 18 it was negative. When the tuberculin was increased from 2 dcmgm. to 5 mgm. a violent focal reaction was provoked. The diagnosis of lupus was clinched by a microscopic examination of a nodule excised from the left cheek. Treatment with light was, therefore, prescribed, and rapid improvement was effected. The positive Wassermann reaction may have been due to mixing of specimens, but it is conceivable that the patient was syphilitc, although the local condition was undoubtedly lupus. The folly of attaching great importance to a negative reaction in the diagnosis of syphilis is shown by the following case.

A woman, aged 28, gave no history of syphilis. Over the whole of the left arm was an extensive, nodular syphilide. There was also a similar eruption, accompanied by cicatrisation in parts, distributed over the left side of the back and chest. Wassermann's reaction was found to be negative, and no antisyphilitic treatment was prescribed. The disease progressed, and when Wassermann's reaction was again taken, it was found to be positive. Three injections of grey oil were prescribed, in addition to 60 grams of potassium iodide, with the result that the rash disappeared.

Not only does the reaction often become negative under treatment, but it also shows an intermediate stage in which it is still present, but less marked than before treatment. But again there are exceptions. Thus, a positive reaction may become still more positive under treatment which may be continued for some time before the reaction begins to approach the negative phase. Syphilis perfectly latent in a patient giving a negative reaction, may be revived, and the reaction may become positive in consequence of an injection of salvarsan. This phenomenon is due to the liberation of anti-bodies and it is comparable with the flaring up of a syphilitic rash in consequence of the administration of mercury or salvarsan. Donath has recorded five cases of late syphilis in which the reaction was not positive till mercury had been given for several days.

Another anomalous observation is that while Wassermann's reaction is rapidly becoming negative, the clinical manifestations of the disease may be steadily progressive. Thus, Fischer has recorded a case of severe ulcerative syphilis in a man whose penis had to be amputated on this account. Under treatment, he soon gave a negative reaction, and with one exception the reaction remained negative; but the ulcerations continued breaking out all the time. The conversion of the reaction from a negative to a positive phase by the administration of salvarsan to a patient with latent disease is regrettable if, as often happens with latent disease, further treatment with salvarsan fails to make the reaction negative again. Buschke therefore advises against stirring up torpid foci of disease by injections of salvarsan.

It is a grave mistake to let Wassermann's reaction be the sole guide to treatment. There is, however, one exception. When a patient has been treated early by an energetic, combined course of mercury and salvarsan before Wassermann's reaction has had time to become positive, it can be assumed that abortion of the disease has been effected. In all other cases a negative reaction should not contra-indicate a course of preventive treatment, particularly in pregnant women who require unusually energetic treatment, as the following case shows.

A woman contracted syphilis in August, 1914. Treatment was not instituted till December, when two injections of salvarsan were combined with a course of mercurial inunction, lasting 50 days. In January, and again in March, 1915, Wassermann's reaction was negative, and further treatment was not prescribed. In May, 1915, she gave premature birth to an infant, which was admitted to hospital next month suffering from severe congenital syphilis.

It is curious that syphilis of the bones is often associated with a negative reaction. This is not only the case in slight, chronic periostitis of the tibia and sternum, but also in extensive gummatous disease of the bones, and large syphilitic exostoses. The phenomenon is so common that Blaschko considers a negative reaction the rule in osseous syphilis. The reaction may also be negative in the bilateral, chronic arthritis of the knees observed in congenital, tertiary syphilis. Wassermann's reaction should, therefore, not be taken too seriously when the diagnosis and operative treatment of certain bony lesions are discussed.

In late syphilis the nature of Wassermann's reaction depends largely on the distribution of the disease. When it is "mono-symptomatic" the reaction is more often negative than positive. In 62 such cases of tertiary syphilis the reaction was positive in 23 and negative in 39. These mono-symptomatic cases included solitary gumma of the brain, single bone lesions, aortitis and aneurism. In tertiary syphilis with extensive disease, mostly of the skin, the reaction was positive in 106 out of 114 cases.

The writer has observed 25 cases of syphilis sent to the Finsen Institute. With one exception the disease had not been diagnosed or treated. Two patients had even been given non-syphilitic treatment at the Institute because of a negative reaction. Fifteen suffered from tertiary, "mono-symptomatic" disease, and the recognition of its true nature was, accordingly very difficult.

The following cases are illustrative of secondary syphilis with a misleading Wassermann reaction.

A man, aged 27 years, was infected towards the end of March, 1914. A month later he developed a sore on the penis and consulted a practitioner, who was doubtful as to its nature. As Wassermann's reaction was negative on May 11, and again on June 13, syphilis was excluded. In August the writer found papules with spirochætes in the nose and anus, and papules on the hard palate. Wassermann's reaction was again negative at this stage.

A man, aged 28, was infected on May 20. A few days later he developed two small sores, which he treated with iodine. A practitioner subsequently prescribed Metchnikoff's calomel ointment. At the end of July he developed a large papular erüption. Another practitioner now suspected syphilis, but he abandoned this diagnosis when, on August 5, he found Wassermann's reaction negative. The writer saw the patient on August 10, when he had a typical, papular syphilide, universal adenitis, and a single, typical eroded papule on the mucous membrane of the lower lip. On August 10, the reaction was still negative. After eight days' treatment with mercury, the rash disappeared.

The following cases show how Wassermann's reaction may be misleading in tertiary syphilis.

A man, aged 32, developed a rash on the soles of his feet. He was treated by six different practitioners, two of whom were specialists. One suspected syphilis until he found Wassermann's reaction negative. At the end of a year, the writer saw the patient. There was a large eruption of typical syphilitic papules on the soles of the feet. There were also groups of ulcers on the shins and thighs, and early interstitial glossitis. Wassermann's reaction was now positive. Under a month's treatment with mercury, all the symptoms disappeared.

The following case shows the unreliability of Wassermann's reaction in syphilis of the muscular system.

A man, aged 35, had contracted syphilis some years earlier, and had been treated for three years. Several years later he developed extensive myositis of the whole of the right sterno-cleido-mastoid, which was boggy and infiltrated, its surface being irregular and adherent to the skin in places. There was no ulceration or cicatrization. Wassermann's reaction was negative, and for two years specific treatment was withheld. As soon as mercury and potassium iodide were given, improvement began, and after ten injections of grey oil and 315 grams of potassium iodide had been given the patient was practically cured. Wassermann's reaction on two subsequent occasions was still negative.

A negative reaction is not uncommon in a syphilitic woman soon after labour.

The following case shows how important it is when syphilis of the central nervous system is suspected, not to rely on Wassermann's reaction in the blood, but to control it by the reaction of the cerebro-spinal fluid.

A woman, aged 44, had never undergone treatment for syphilis, although her husband was syphilitic. At 38 she gave birth to a syphilitic infant. Subsequently she became very nervous, forgetful, tired, and emaciated. There were no signs of tabes, the eyes were healthy, and five examinations by Wassermann's reaction of the blood were negative. The Wassermann reaction of the cerebro-spinal fluid was positive.

Conclusions.

A positive Wassermann reaction in a case of latent syphilis is important, for it is the best proof that the patient is not yet cured. A positive reaction is of great value when the diagnosis of syphilis is uncertain ; but although it almost certainly indicates syphilis, it does not give the site of the disease. A negative reaction, and even a series of negative reactions, are almost valueless in the diagnosis of syphilis, particularly when the patient has recently been treated, and when the disease is latent. But even when the disease has not been treated a negative reaction is not uncommon. Both in treated and untreated cases the reaction occasionally fluctuates from positive to negative, with only a few days' or weeks' interval. It is, therefore, advisable to repeat the reaction several times in most cases. Finally, it is a golden rule to rely on the clinical diagnosis of typical syphilis, however often Wassermann's reaction is negative.

IX.—THE ELECTRIC OPHTHALMOSCOPE.

(1) **Claiborne, J. Herbert.—A review of the history of the electric ophthalmoscope, with a demonstration of a new ophthalmoscope, which consists of a re-arrangement of the parts of antecedent instruments.** *Trans. Amer. Ophthal. Society*, Vol. XIV, Part i, 1915, p. 150.

(2) **May, Charles H. — The May electric ophthalmoscope.** *Trans. Amer. Ophthal. Society*, Vol. XIV, Part i, 1915, p. 165.

(1) Two facts emerge from this article by **Claiborne,** of New York City : 1. That the electric ophthalmoscope was invented by Dennett in the year 1884. 2. That the dry-cell in the handle of the appliance was first used by Crampton, of Philadelphia. Claiborne suggests that "all electric ophthalmoscopes henceforth be designated by hyphenated names, in which that of Dennett shall take precedence."

Claiborne describes a modified electric ophthalmoscope, of which details must be sought in the original. SYDNEY STEPHENSON.

(2) **May,** of New York City, claims among other advantages of his electric ophthalmoscope, that it throws a solid illuminated surface on the fundus of the eye, and that nothing is seen of the lamp filament. This is mainly effected by a solid rod of glass, which acts as a condenser at the lower part and as a reflecting prism at its upper part. May believes that this system of illumination is superior to that now in general use,(reflecting mirror), and that it is free from shadows, reflexes, or lamp-film effects, and that it lights up the fundus much better. By a slight modification, the electric ophthalmoscope can be converted into a transilluminator. A comparatively simple form of the instrument is constructed for the use of the general practitioner. SYDNEY STEPHENSON.

X.—THE MONTESSORI SYSTEM.

(1) **Paton, Leslie.—Montessori education for children with defective sight.** *Proceedings Royal Society of Medicine, Section of Ophthalmology*, April, 1915.

(2) **Harman, N. Bishop.—The education of children with defective vision** *Ibidem.*

(1 and 2) It is difficult for one who has no practical experience in the detailed working of either the Montessori system or of special myopia classes to appraise correctly the two communications respectively by **Paton** and **Harman**, both of London. Both papers deal with the Montessori system, the former from a favourable, the latter from an unfavourable standpoint. At first sight, the two communications seem strongly opposed to each other in this respect; while, in addition, Harman advocates the "myope class" as a better method of educating British children than the Montessori system, whatever may be the experience in Italy. But, in reality, the divergence of opinion is of little account, for while Paton is advocating the Montessori system for the pre-education period in defective-sighted children, Harman is dealing with the actual educational period. It seems hardly necessary to deal at length with the actual papers beyond saying that Paton gives an outline of the Montessori system, with which he has been greatly impressed, while Harman, after trouncing that system as unsuitable for British children, gives at considerable length an account of the methods employed in the classes which have been established for children with defective sight, and which, because the greater number of children attending them have defective sight from myopia, have been called "myope classes".

Both communications will well repay perusal. S. E.

XI.—MISCELLANEOUS.

(1) **Kraupa, E.—Visible circulation in the choroidal vessels. (Die sichtbare Blutströmung in den Aderhautgefässen.)** *Centralbl. f. prak. Augenheilkunde*, February, 1911.

(2) **Arnold, Philipp.—Changes in the surface relief of the iris in the situation of the fœtal cleft. (Veränderungen des Oberflächenreliefs der Iris an der Stelle des Augenblasenspaltes.)** *Klin. Monatsbl. f. Augenheilkunde*, October, 1911.

(3) **Monteresi, Nicola.—The cortical centres in relation to vision. (Centri corticali in rapporto alla visione.)** *Archivio di Ottalmologia*, Vol. XIX, No. 4, October, and No. 5, November, 1911.

(4) **Campos.—Notes for use in the study of visual projections. (Notes pour servir à l'étude des projections visuelles.)** *Revue Générale d'Ophtalmologie*, 31 août, 1912.

(5) **Bettremieux.—Why are the statistics as to the refraction of school children so inconsistent? (Pourquoi les statistiques relatives à l'état de la réfraction chez les écoliers sont-elles si peu concordantes?)** *Ann. d'Oculistique*, septembre, 1912.

(6) **Bates, H.—The education of the eye in amblyopia ex anopsia. (L'education de l'œil dans l'amblyopie ex anopsia.)** *La Clinique Ophtalmologique*, 10 décembre, 1912.

(7) **Isakowitz, J.—On dazzling due to association of ideas. (Ueber Blendung durch Assoziation.)** *Klin. Monatsbl. f. Augenheilk.*, February, 1913.

(8) **Cuny.—Further researches upon the connection between visual acuity and efficient musketry in the infantry. (Weitere Untersuchungen über den Zusammenhang von Sehschärfe und Schiessleistung der Infantrie.)** *Zeitschrift für Augenheilkunde*, February, 1913.

(9) **Luedde, W. H.—A microscopic study of the conjunctival vessels.** *American Journal of Ophthalmology*, May, 1913.

(10) **Edridge-Green, F. W.—A criticism of the Report of the Departmental Committee on Sight Tests.** *Lancet*, June 21st, 1913.

(11) **Josefson, Arnold.—The occurrence of unilateral visual hallucinations and macropsia in a case of cerebral tumour.** *Lancet*, January 24th, 1914. (Abstract from *Deutsche Zeitschrift fur Nervenheilkunde*, date ?).

(12) **Cockayne, E. A.—Case of ocular torticollis.** *Proceedings Royal Society of Medicine: Section for the Study of Disease in Children*, April, 1914.

(13) **Seligmann.—Ophthalmophobia the "evil eye." Die Angst vor dem Blick.)** *Zeitschrift für Augenheilkunde*, April-May, 1914.

(1) The phenomenon of the interrupted blood stream has often been seen in the retinal vessels, and can frequently be obtained experimentally, *viz.*, by pressing on the eyeball with the finger, the vessels become more empty and in the veins the red blood cells tend to form clumps and the movement of these clumps can be seen. This occurs in pathological conditions where there is obstruction to the venous outflow, such as thrombosis and glaucoma.

Kraupa, of Prague, relates two cases in which this phenomenon was seen in the choroidal veins of highly myopic eyes, where the extensive disappearance of pigment made these vessels unusually visible. He supposes that here also there must be some obstruction to the venous flow, produced possibly by a narrowing of the vessels—the result of the old choroiditis. He states that these cases must be much more frequent than commonly supposed, but the choroidal vessels must be very carefully observed if it is to be discovered.
A. LEVY.

(2) After describing the normal appearance of the anterior aspect of the iris, and mentioning some peculiarities hitherto described, **Arnold**, of Munich, gives details of a number of anomalies which have come under his own observation. These, which are well illustrated in a coloured plate, may be briefly mentioned as follows.—(1) In the lower part of the iris the lesser circle appears as if dragged over the pupillary zone towards the margin of the pupil. The pale nodules described by Wölfflin are present at the periphery of the iris. (2) The same, with considerable thickening of the iris trabeculæ at the point in question. (3) Partial coloboma of the iris. A wedge-shaped gap in the anterior layers of the iris, its base at the lower ciliary zone, and its apex at the pupillary margin. (4) In the lower part of the iris a fan-shaped defect of the anterior surface, expanding from pupillary towards ciliary zone, of brown colour, with several deeply pigmented, almost black, spots. (5) Fan-shaped heterochromic brown patch below, radiating from pupil margin. Thickening of the trabeculæ in this

situation. (6) A small brown patch radiating downwards from lower margin of pupil.

The anomalies in the first three cases were bilateral, but in the others one eye only was affected. These defects are all assumed to be related to the fœtal cleft in the optic vesicle. Another case is reported in which, in the lower-outer part of the iris, two tongue-shaped prolongations of the lesser circle of the iris pass across the pupillary zone and encroach on the pupil. This defect is believed by the author to be related to the various forms of persistent pupillary membrane. A. J. BALLANTYNE.

(3) This is a very long paper indeed, extending, as it does, through nearly 150 pages of the *Archivio*. It is, in consequence, not suited for abstract, and a few remarks to indicate the scope and nature of the subject only will be attempted.

Monteresi begins by giving short notes on the comparative anatomy of the eye, indicating by what means vision is accomplished, and then proceeding to describe the visual parts of the brain in general.

Thereafter, the author goes into the literature concerning the paths of fibres in the brain, showing how they have been traced out.

The cortical and other centres are then discussed, muscular and sensory, in detail, with references to comparative anatomy, of course, as well as to cases of disease and injury of the brain recorded in literature, which have a bearing on the subject.

The paper, we hardly require to say, is a work requiring immense research in literature, and reflects the highest credit upon the author who has carried out this investigation. To the student of the subject the work is certain to be of great service, and the only criticism which can be made is that an index of subjects, and possibly of writers consulted, would have assisted the readers of so long a paper very considerably. LESLIE BUCHANAN.

(4) The article by **Campos**, of Cairo, is of a physiological nature, and should be read in the original. It is directed towards the proof that the images seen in physiological binocular diplopia are retinal images normally projected, and not, as held by Parinaud, virtual and cerebral.

ERNEST THOMSON.

(5) **Bettremieux,** of Roubaix, calls attention to the inconsistencies which exist in the published statistics as to the refraction of school children, and suggests that these do not entirely depend on variations in the different forms of ametropia prevalent in different localities, but are largely due to differences in the methods of measuring the refraction and classifying the results. He urges that a uniform system of classification should be adopted, and considers that Lawson's principle of tabulating mixed cases according to the most serious defect should be adopted, and that astigmatism, on account of its influence and the development of myopia, should be given pride of place. R. J. COULTER.

(6) The reviewer is not quite sure that he entirely follows the meaning of all that is said by **Bates,** of New York, in this article translated into French. It is certain, however, that Bates asserts the curability of amblyopia at practically any age ; denies that special apparatus, like the stereoscope or the amblyoscope of Worth, is necessary ; and believes that his method is original. Put shortly, the method resolves itself into a system of argumentation between the doctor and the patient as to what the latter sees on a Snellen test-type, why he sees the letters in such and such a way when he looks in such and such a direction relatively to the true line of vision, and of good resolutions on the part of the patient to go on and prosper once he has learnt the rudiments of training the defective eye in the way it should go. One can quite

imagine that the method is one that, given plenty of time, will work with an intelligent patient, but is tempted to ask how often the combination of favourable circumstances occurs in proportion to the number of amblyopic patients met with in daily practice. ERNEST THOMSON.

(7) Although in popular language a distinction is drawn between real and imaginary pain, the qualitative difference is not a sharply marked one. Both involve a physiological process in the cerebral cortex, only the mode of exciting it is different. The bodily symptoms accompanying the phenomenon may be the same in both cases, for example, dilatation of the pupil, vomiting, etc

Isakowitz, of Berlin-Hallnsee, records a personal experience which seems to show that this statement applies to the phenomenon of dazzling, which, in general, is only excited by a peripheral stimulus. By dazzling, of course, he means the disagreeable or painful sensations accompanying the incidence of strong light on the eye, leading to darkening of the visual field and to the formation of after-images. If, in the course of his reading, he comes to a description of a scene involving a bright sun, a glare of fire, etc., he experiences a feeling of dazzling, the print becomes for a time dim or disappears, and he has to turn away or shut his eyes. Something similar occurs if he looks at a picture in which a bright light or fire is represented.

A. J. BALLANTYNE.

(8) **Cuny** examined 271 soldiers and found that most of them had normal vision. Those who saw best shot best, and those who wore spectacles shot better than those who did not. The paper covers the same ground as Scherer's (*Zeitschrift f. Augenheilkunde*, 1911), and the author reaches identical conclusions which, after all, are what might be expected.

T. HARRISON BUTLER.

(9) We have already noticed at considerable length an article of **Luedde,** of St. Louis, in the *American Journal of Ophthalmology* of date August, 1912, (THE OPHTHALMOSCOPE, February, 1913). The present article has as sub-title, "Report on a series of seven hundred examinations," but as the tabular statement has been omitted and only a kind of review of the work given, we need merely say that this article is on similar lines to the last, in so far as it emphasises the value, especially as regards angiosclerosis, of a study of the vessels of the conjunctiva. ERNEST THOMSON.

(10) This article, by **Edridge-Green**, of London, in criticism of the Report of the Committee on Sight Tests, should be read in the original.

(11) We would draw the attention of readers of THE OPHTHALMOSCOPE to the abstract on this subject given by the *Lancet* under the above date.

(12) The case of ocular torticollis by **Cockayne**, of London, was in a boy, aged six and a half years, who, when two months old, was noticed to hold his head to the left. In the position naturally taken up by the lad no squint was visible, but on straightening the head, the right eye deviated upwards and inwards (strabismus deorsumvergens). The patient, however, would not admit that diplopia was present when the head is straightened. Ocular movements good. The head could be tilted over to the right voluntarily. 2·5 D. of hyperopia. SYDNEY STEPHENSON.

(13) **Seligmann** read a communication before the Medical Society of Hamburg upon "ophthalmophobia," the dislike of being stared at. The subject may be divided into three groups. Mild ophthalmophobia includes persons who when they notice anybody looking at them, at once begin to wonder whether their hats are on straight or whether in some other way they appear peculiar. The severe type makes the sufferers perfectly miserable. If a woman is afflicted with severe ophthalmophobia, she wears a thick veil or hides her face

behind a fan; a man uses a newspaper or gets into the shadow of a piece of furniture, his hands get cold, and his face perspires freely. The third section of the subject is the "evil eye." Many of the Southern and Eastern semi-civilized and native races believe that certain individuals possess the evil eye and are able to cause disease, misfortune, and even death, by simply gazing at the victim. To avoid the "evil eye" charms and armlets are worn. Even in Germany, a trace of this superstition is evident. Seligmann says that even "cultured" persons when praised, tap three times under the table, and say "*Unberufen.*" T. HARRISON BUTLER.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE ÆTIOLOGY OF GLAUCOMA.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—In his letter in your February issue, Mr. T. Henderson says that I have criticised his views, on the assumption that sclerosis of the pectinate ligament is the only factor he has brought forward. He also says that I have given your readers the impression that he had never discussed the physiology of the intra-ocular pressure, or brought forward any explanation for the shallow anterior chamber or for the adhesion of the iris root. It was not my intention to convey any such impression as Mr. Henderson has read into my article; nor, on carefully re-reading that article, can I find that I have conveyed such an impression.

Equally, however, I had no intention of discussing at length the work of any individual writer, except in so far as I considered such work to be of value. This, I think, Sir, is the duty and the privilege of every reviewer.

As to the opinions I have expressed, they have been very deliberately formed after most careful consideration, and I have nothing either to add to them or to take away from them.

Yours truly,

R. H. ELLIOT,

M.D., LT.-COL. I.M.S. (RETIRED).

54, WELBECK STREET, LONDON, W.
February 1*st*, 1916.

BOOK NOTICES.

Transactions of the American Ophthalmological Society. Vol. XIV, Part I. Philadelphia: 1915.

This liberally illustrated volume of upwards of four hundred pages represents the proceedings of the fifty-first annual meeting of the American Ophthalmological Society held at New London, Conn., in July, 1915. It opens with sympathetically written notices of Hasket Derby, George Strawbridge, Emil Gruening, and M. Hayward Post, members of the Society who have joined the great majority since the last annual meeting, accompanied in each case by a photograph of the deceased member. This is a sad but interesting feature of the volume. After sixteen pages devoted to the minutes of the proceedings, the main business is come to, namely, the publication of no fewer than thirty-four scientific communications, many illustrated in black and white or colour. It were invidious to select any of the contributions for special mention in this place, but abstracts of all that are suitable for the purpose will be published in our columns in due course. In the meantime the American Ophthalmological Society may be cordially congratulated upon the appearance of so handsome a volume. SYDNEY STEPHENSON.

Trachoma, a Menace to America.—Its Prevalence, its Effects upon Vision, and the Methods of Control and Eradication. National Committee for the Prevention of Blindness, 130, East 22nd Street, New York City. December, 1915. Individual copies free on request. Price per 1,000, 40 dollars.

This bright and interesting *brochure*, one of the publications issued by the National Committee for the Prevention of Blindness, is written by a layman, Mr. Gordon L. Berry, Field Secretary to the Committee. He has received much help from medical men interested in trachoma, whose services are duly acknowledged in the preface. It is well worth perusal, and as for the motives that have prompted its publication, we have, naturally, nothing but praise.

The signs and symptoms of trachoma are clearly described (and illustrated). The illustrations, as a whole, are remarkably good ; but we would venture to suggest that Fig. 1, showing acute trachoma, and another figure, showing pannus, might be bettered.

The reports of the Public Health Service of the United States show that trachoma is "rather frequent" along the Atlantic seaboard, and in certain sections of the south and west, especially in the mountain sections of Kentucky, Virginia and West Virginia, in Southern Illinois, in Arkansas, in the mountains of Southern Missouri, and among the Indians on all reservations except in New York State. Although primarily found almost entirely among foreigners, the disease has now spread to centres contiguous to the infected areas, and, where opportunity presents, it attacks even the most blue-blooded Americans. A careful survey by the United States Public Health Service has shown that in the State of Kentucky there are 33,000 cases of trachoma. Again, of the 323,000 Indians in America, fully 20 per cent. are infected. It is difficult to understand how trachoma secured such a hold among the Kentucky mountain people. These people live by themselves in little homes, rarely grouped so as to form even a small settlement, and almost completely cut off from the world at large. In the mountains the creek-beds, which have known no shaping by the hands of man, are almost the only roads. Among these people, of whom there are about half a million, old customs prevail—"the loom, the spinning wheel, the lard kettle, the candle mould, the same old English songs and customs, the Elizabethan phrases of speech still lingering." The house, often consisting of but a little room, sometimes even without a window, harbours the entire family, numbering from five to fifteen members. It is no uncommon thing to find several cases of trachoma in one family, and in one creek, taken at random, there were sixteen cases of trachoma in ten consecutive homes.

The immigration figures are most interesting.—During the ten years ending 30th June, 1914, a total of 11,966,897 aliens were examined at the ports, and 22,984 were found to suffer from trachoma. When one considers that inspections are made at foreign ports to prevent the embarkation of diseased aliens, it is clear that many times greater numbers were prevented from coming to America at all, For example, during the year ended 30th June, 1906, 22,600 cases of disease in general were prevented from embarking at foreign ports. Most of the trachoma cases come from Southern Italy, Russia, and Syria, and inasmuch as a very large proportion of the recent emigration to the United States is derived from those countries, it is but reasonable to infer that considerable infection must come from the sources in question.

One of the health authorities is responsible for suggesting that the continued spread of trachoma in America is due to desertions among foreign seamen temporarily in the ports of the United States. There are said to be

30,000 such desertions annually. A considerable percentage of the deserters has been shown to suffer from trachoma.

The opportunity is taken of describing an outbreak of trachoma which occurred among the employés of the Youngstown Sheet and Tube Company, Ohio. In 1903 a case of trachoma was found in the emergency hospital attached to the works, and in course of the next fortnight, two more cases were reported. At this stage the United States Public Health Service sent a surgeon to examine into matters. He examined the eyes of several thousand employés, among whom he found that trachoma was present in 1·3 per cent., mainly among the Roumanians, Croatians, and Magyars, who formed only about 28 per cent. of the people examined. The sanitary conditions in the homes of the workmen were stigmatized as favourable to the spread of the disease. A hospital was established for the exclusive treatment of trachoma, at the expense of the Sheet and Tube Company, and the sanitary arrangements were revolutionised. Complete eradication of the disease has not even yet been effected. As to Kentucky, the Public Health Service has established five hospitals, each containing no fewer than fifteen beds, properly staffed and organised. The schools are inspected for cases of trachoma. Pains are taken to educate the people and the community to the dangers of insanitation. In many States trachoma is a notifiable disease.

Extremely striking are the illustrations of this pamphlet, which, aside from those illustrating the disease and its complications, show the Indian cabins and the primitive dwellings from which the trachomatous patients are drawn, the creek-beds of Kentucky (the only roads for the patients to reach the trachoma clinic), and one of the trachoma hospitals established by the United States Public Health Service at Jackson, Kentucky.

The frontispiece, which we reproduce on p. 173, shows how trachoma and other infective diseases of the eye may be spread by the "Jack" or roller towel.

SYDNEY STEPHENSON.

THE OPHTHALMOSCOPE DIARY.

	1916.	
Midland Ophthalmological Society.	April 4th	Midland Eye Hospital, Birmingham.
Ophthalmological Society of the United Kingdom.	May 4th, 5th, & 6th	London.
American Ophthalmological Society.	May 9th & 10th	Washington, D.C.
Midland Ophthalmological Society.	June 6th	Eye Hospital, Cheltenham.
Royal Society of Medicine: Section on Ophthalmology	June 14th	1, Wimpole Street W.
Oxford Ophthalmological Congress.	July 13th & 14th	Keble College, Oxford.
American Academy of Ophthalmology and Oto-Laryngology	Dec. 5th, 6th, & 7th	Memphis, Tenn.

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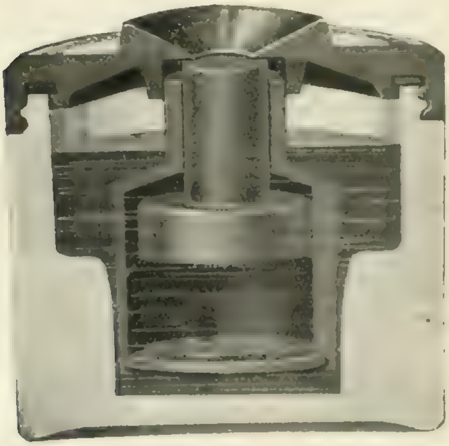

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THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. XIV.—No. 4.] *APRIL 1, 1916.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

ON THE CAUSE OF THE OPHTHALMOSCOPIC APPEARANCES IN AMAUROTIC FAMILY IDIOCY.*

BY

THE LATE GEORGE COATS, F.R.C.S.,

LONDON, ENGLAND.

IN a recent paper (*Proc. Roy. Soc. Med.*, Vol. VIII. *Sect. of Ophth.*, p. 70, 1915) F. E. Batten and M. S. Mayou record a pathological examination of the condition first described by one of these authors under the name of "Family Cerebral Degeneration with Macular Change." Speaking of the nature of the retinal lesions, the following statements are made.—"There is a close relationship between these cases and the cases of amaurotic family idiocy . . . The only difference in the two diseases appears to be that the macular region in amaurotic family idiocy shows a much more marked œdema of the internuclear layers and therefore a white area around the macula which is associated with a hole or thinning of the retina at the fovea due to œdema." This view is reinforced by an account of the histological changes observed in a case of amaurotic family idiocy, in the course of which it is stated that "around the macula there was a very marked œdema of the internuclear layers, which probably corresponds to the white area which is seen during life"; and the conclusion arrived at is that "the œdema of the internuclear layers is present in both diseases, but is very much more marked in the case of amaurotic family idiocy."

It is the purpose of the present communication to dissent emphatically from this description of the histology of the retina in amaurotic family idiocy.

A histological study of the retina, to possess any value, must satisfy three conditions: (1) the material must be absolutely fresh—according to Birch-Hirschfeld, *post-mortem* changes begin within two hours of death; (2) fixation must be perfect, Zenker's solution being by far the best for this purpose, especially in the intact globe; and (3) the method of cutting must be suitable, paraffin being greatly inferior to celloidin, even with the greatest care and with the best fixed material. Insistence on these pre-requisites eliminates nearly everything that has been written on the histology of the retina in amaurotic family idiocy. In my opinion, it eliminates the case on which Batten and Mayou rely. It is true that the eyes were injected immediately after death, and fixed within an hour; but formalin, the worst of all retinal fixatives, was used, and to judge by the microphotographs (Fig. 5 of their paper), the sections were cut in paraffin.

It would seem that not more than three or four cases have been recorded to which no exception can be taken on the above-mentioned grounds; namely, (1) Cohen and Dixon (*Journal Amer. Med. Assoc.*, Vol. XLVIII, p. 475, 1907); eyes obtained in 2½ hours, fixed one in formalin, one in Orth's solution; (2) Verhoeff (*Arch. of Ophth.*, Vol. XXXVIII, 107, 1909); eyes obtained within 15 minutes of death, fixed one in formalin, one in Zenker; (3) Hancock and Coats (*Brain*, Vol. XXXIII, p. 514, 1911); eyes obtained within ten minutes of death—fixed one in Müller, one in Zenker; (4) perhaps also the case of Holden (*Journal Nerv. and Mental Diseas.*, Vol. XXV, p. 538 and 550, 1898); eyes obtained four hours after death, one fixed in formalin, one in Müller.

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* Read on February 2nd, 1916, by R. Affleck Greeves, before the Section of Ophthalmology, Royal Society of Medicine.

The testimony of these cases is unanimous and unequivocal; in each the changes were absolutely confined to the ganglion cell and nerve fibre layers, and in each it is specifically stated that there was no œdema, nor was there any folding, thinning, or formation of holes at the fovea.

An examination of the fovea in the case described by Hancock and Coats (Fig. 1) and a comparison of it with the normal Zenker-fixed fovea (Fig. 2) will sufficiently establish the validity of these statements. In Fig. 1 the condition of the cones proves that fixation leaves little to be desired; let this photograph be compared with Batten and Mayou's Fig. 5. Manifestly, even a single case of this kind would greatly outweigh any number of observations on material less perfectly fixed. Nor is it likely that the difference can be explained by the stage of the process at which the material is obtained, œdema being present at one time, not at another; for it is probable that in all cases the material

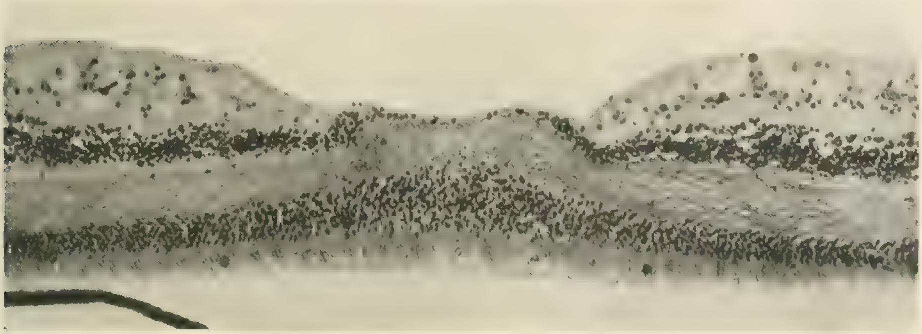

FIG. 1.

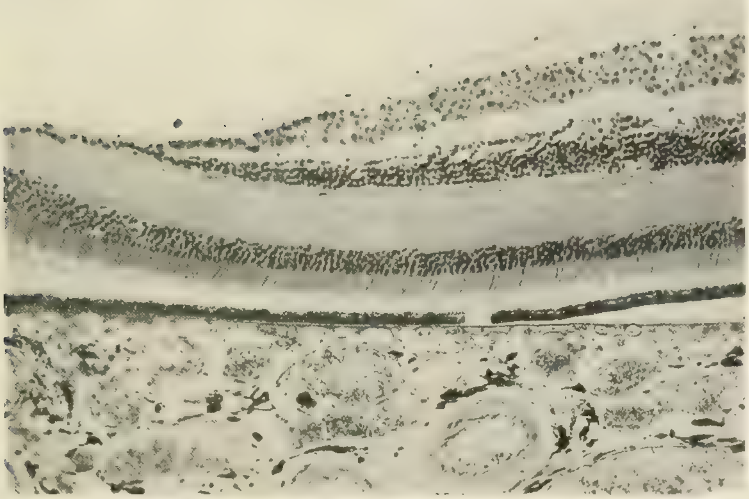

FIG. 2.

becomes available at approximately the same point in the histological process—that which corresponds with the death of the patient.

On the question of the similarity in the two diseases of the ganglion cell changes in the retina and central nervous system, I am not competent to pass an opinion. The statement of F. E. Batten that "on the pathological side, the cases were an exact counterpart of each other" must carry the greatest weight. As regards the retina, however, it must be pointed out that, apart from the occurrence of œdema, the other changes at the macula show very considerable differences, which should not be slurred over. Briefly, the changes in family cerebral degeneration are as follows.—(1) Certain cytological degenerations of the ganglion cells; (2) a diminution amounting in places to a complete disappearance of these elements; (3) œdema of the internuclear layer; (4) loss of the rods and cones, and of the "inner" (surely this should read "outer"?) nuclear layer; (5) thickening of the supporting elements; (6) immigration of pigment into the outer layers of the retina.

Of these only the first two are present in amaurotic family idiocy, and with regard to the second, it was a very striking point in the case examined by Hancock and myself that the diminution in the number of ganglion cells was much less than might have been expected from the degree of degeneration, and nowhere even approximately amounted to a total suppression of these elements.*

Again, although some hold an opposite view, it is the general opinion of ocular pathologists, founded on the conditions observed in choroido-retinitis and retinitis pigmentosa, that immigration of pigment into the retina of necessity implies a lesion, vascular or other, of the choroid, or at least the action of some noxious agent from the side of the uvea; and the same holds good for degeneration of the rods and cones and outer nuclear layers. But whether or not this rule be of universal application, it is certainly very difficult to believe that a disease which progresses so far as to cause death without producing the least change in the outer layers of the retina, can be the same as one which is evidently associated, even in an early stage, with such changes, as is shown by the disturbance of pigment at the macula. There is, I believe, no known instance of a disease which first attacks the inner retinal neural elements, and then the outer, although instances of the opposite sequence of events might be cited; nor does destruction of the inner layers from whatever cause produce any consecutive secondary change in the outer, however long the duration of the lesion, as is exemplified, for instance, in the case of obstruction of the central artery or primary optic atrophy, in which the rods and cones and outer nuclear layer remain permanently intact.

These arguments tend to support the view that in spite of a close similarity or identity of the changes in the ganglion cells, the fundamental pathology of the two conditions is different. Is histological identity an irrefragable proof of aetiological identity? After all, the tissues of the body have only a limited number of ways in which they can react to noxious influences; amyloid degeneration has the same histological characters, whether it be due to syphilis or tubercle, or to neither of these affections, as in the conjunctiva; fatty degeneration of the liver is much the same whether its cause be phosphorus poisoning or acute yellow atrophy. Is it not possible, then, that the particular forms of chromolysis, vacuolisation, etc., which characterise family cerebral degeneration are closely similar to, or identical with, those of amaurotic family idiocy, while yet the underlying cause is

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[*] If the histology of the ganglion cell changes is the same in the two diseases, perhaps this apparent loss of cells in family cerebral degeneration accounts for the absence of the typical retinal opacity in that affection.

different? The hitherto practically unchallenged race-selectiveness of amaurotic family idiocy should in itself make us pause before we identify that disease with any other which is not race-selective.

I may perhaps be permitted in a brief addendum to repudiate an opinion which was ascribed to me in the discussion on Batten and Mayou's case, but which I have never held, namely, that the ophthalmoscopic appearances in amaurotic family idiocy are due to coagulation necrosis. As its name implies, coagulation necrosis is a change in the tissue proteids probably allied to coagulation, and due to their sudden death *en masse*. Suddenness is of the essence of the process, for if death be protracted not coagulation necrosis, but fatty degeneration, etc., ensue. The dead tissues subsequently undergo various forms of regressive change, invasion, absorption, etc. To attribute to such a process a condition whose out-standing features are chronicity and permanence over a period of years would be a patent absurdity.

The misunderstanding has probably arisen from the fact that, following Hancock, I have used the case of amaurotic family idiocy in illustration of another thesis originally postulated by Elschnig, namely, that the similar ophthalmoscopic appearances in obstruction of the central artery of the retina, which have also been ascribed to œdema, are due to coagulation necrosis. The argument might be stated as follows.—Amaurotic family idiocy furnishes an example of a condition, which, although demonstrably confined to the inner layers of the retina, without œdema of the outer, yet produces a white area in the macula and a cherry spot; there is nothing improbable therefore in similar ophthalmoscopic appearances being due, in the case of obstruction of the central artery also, to a condition confined to the inner layers of the retina, without œdema of the outer. Not the same condition, of course; in the first case it is a chronic degeneration of the cytoplasm which is more or less permanent, in the second an acute coagulation necrosis due to cutting off of the blood supply, and disappearing when the necrosed tissues become absorbed.

The point was only a minor link in a chain of evidence supporting the conclusion in question, and was used as an illustration rather than as an essential element in the proof. The other links may be summarised as follows:

1. Nowhere in the body does obstruction of an end-artery cause œdema. To put it syllogistically: Obstruction of an end-artery is followed by coagulation necrosis (white infarction); the central artery of the retina is an end-artery; therefore obstruction of the central artery is followed by coagulation necrosis. The retinal changes are, in fact, a white infarct of the inner layers, which receive their supply from the central artery.

2. The ophthalmoscopic appearances produced by macular œdema are well-known, and may be studied in cases of nephritis, papillœdema, and perhaps Berlin's contusion opacity. They differ considerably from those of obstruction of the central artery; in particular, the opacity is never nearly so dense, and there is no cherry spot.

3. The distribution of the opacity is at variance with the hypothesis that it results from œdema. If due to that cause the opacity should be present in the periphery as well as in the macula, although perhaps allowing for the greater thickness of the retina at the posterior pole, it might be less in degree in the former situation. There is no reason also why œdema should spare the fovea, and, in fact, in the conditions mentioned under (2), it does not do so; pathologically, as is well known, the fovea is a favourite seat of œdema. On the other hand, coagulation necrosis of the ganglion cell and nerve fibre layers renders a completely satisfactory account of the greater density of the

opacity at the macula where these layers are thickest, and of the immunity of the fovea and periphery where they are absent or too thin to be the cause of visible ophthalmoscopic changes.

4. Œdema offers no explanation of the fact that, roughly speaking, the opacity always persists for about the same time. Evidently this time is the period required for the breaking down and absorption of the necrotic layers, not for the absorption of œdema, for it is certain that the rapidity and completeness of the restoration of the circulation is subject to very large variations.

5. The evidence derived from actual pathological observation is incomplete, the opportunities of acquiring perfectly fresh material from recent cases of obstruction being of necessity extremely rare. No case appears to have been reported which has been altogether satisfactory from this point of view, and also from the standpoint of perfect fixation.* Such as it is, however, the the testimony of these cases is very equivocal ; the changes described as œdematous have been very slight, e.g. the formation of small spaces in the nerve-fibre layers, etc., and are manifestly insufficient to account for the extremely dense opacity which is characteristic of the ophthalmoscopic picture. For a discussion of these points, and of the experimental evidence, which is no more conclusive, reference may be made to a paper in the *Roy. Lond. Oph. Hosp. Rep.*, Vol. XIX, p. 63, 1913.

THE ÆTIOLOGY OF GLAUCOMA.

(Concluded.)

BY
R. H. ELLIOT, M.D., F.R.C.S.,
LT.-COL., I.M.S. (RETIRED),
LONDON, ENGLAND.

(2) **Sex.**—With regard to influence of sex on the incidence of glaucoma, it may be questioned whether we have anything of value to add to what Priestley Smith[1] taught us nearly a quarter of a century ago. Females suffer in rather larger numbers than males ; the ratio given by that writer was 56·9 per cent. against 43·1 per cent. The chronic non-congestive cases are found perhaps a little in excess in males as compared with females, whilst the congestive forms are nearly twice as common in the latter as in the former. The unstable condition of the female nervous system at the time of the climacteric is probably sufficient to account for this disparity. If, however, we accept this explanation, it is necessary that we should clearly understand where it logically leads us. It presumably means that a very large number of potential cases of glaucoma in males, either never pass the boundary line to declare themselves by entoptic phenomena and other signs and symptoms, or else that they remain simple in nature and are thus overlooked. Probably both events influence our statistics to some extent. In any case, the greater liability of females to congestive glaucoma appears to be due to a wider and more frequent prevalance in them of the exciting as compared with the predisposing factors of the disease. The reflection to

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[illegible] VII [illegible] 22 [illegible] 1914 [illegible] which this leads the thoughtful surgeon is obvious: it cries aloud the need for keeping the possibility of the occurrence of glaucoma, in all its forms, in the very forefront of our minds, when examining the eyes of people who are advancing in years. Eye affections of a painful or congestive type in elderly females should always be carefully examined and watched, whilst failing vision, without an obvious cause to account for it, in either sex, and perhaps particularly in elderly men, should invariably be looked on with suspicion, until a definite cause can be assigned for the trouble.

(3) **Heredity.**—The influence of heredity on the incidence of glaucoma is revealed both in the race and in the family. It is probable that the factors at work are not essentially different in the racial and familial manifestations of hypertension. It is usually stated that Jews, Egyptians, and certain races of negroes are specially liable to the disease. Laqueur[2] pointed out that it was no accident, that of three ophthalmologists who had suffered from glaucoma, two of them, himself and Javal, were Jews. It is of interest to consider the various possible modes of action of hereditary influence. Those that most readily suggest themselves are:—(i) a small size of the eye; (ii) a want of normal development, especially of the parts around the angle of the chamber; (iii) any conditions which would predispose to nervous or vascular storms; and (iv) conditions of environment. We shall take these in turn.

(i) Priestley Smith has laid great stress on the small size of the eyes affected, especially in relationship to a normal or excessive development of the lens. The writer's experience in South India would lead him to think that glaucoma is a very common disease there. The enormous amount of operative work demanded for the relief of glaucoma is, he thinks, more than can be explained by the very large population catered for, even by such a hospital as that at Madras. He has constantly made the observation there, that the eyes which come on the operating table for hypertension, are decidedly below the average in size. He believes that glaucoma is abnormally prevalent in India, and that the cause of this prevalence has a distinct connection with want of development of the globes. It is not usually stated, but it is the result of Madras experience that abnormalities of the eye, the result of defective development, are very common in India.

So convinced is Priestley Smith of the ætiologic *rôle* of the small eye in cases of hereditary glaucoma, that he has suggested that the cornea of any patient coming from a suspected stock should always be measured, with a view to obtaining a clue as to the prognosis. A small measurement would suggest a guarded prognosis, and would indicate that the patient should be carefully kept under observation, whilst the recording of a large corneal diameter would enable the surgeon to set the patient's mind at rest, even though he came from a suspected stock.

Lawford[3] has studied the question of familial glaucoma, and has established the following points: (i) it is continuous in descent; (ii) it exhibits the phenomenon of anticipation; (iii) it occurs in all forms; and (iv) it is transmitted by both sexes.

(ii) A want of normal development of the structures around the angle of the anterior chamber, probably plays a part, but it seems likely that this part is altogether subordinate to its *rôle* in familial cases, which in their turn are allied with buphthalmos.

(iii) From what we know of the great influence exerted on the onset of congestive glaucomatous attacks by those conditions which favour an instability of the nervous and vascular systems, it would be natural to expect to find such tendencies in races which are peculiarly liable to the disease. It must be confessed that in those mentioned, with the exception of the negroes, such racial peculiarities are not at all obvious. The suggestion would therefore be, that it is to the predisposing rather than to the exciting factors of glaucoma, we must look for the explanation of racial tendencies of the kind we are discussing.

(iv) The question of environment opens up a large and interesting field. Has the food of the affected peoples any influence? The rice-fed and poorly nourished Indians become senile earlier than do Western people. Is it possible that a tendency to tissue degeneration is here indicated? Again, there is the effect of brilliant sunlight to be reckoned with. And once again, the frequency of glaucoma in peoples, such as the Indians and Egyptians, amongst whom ophthalmias are very prevalent, suggests a possible causal relation other than that due to perforation and anterior synechia. The possibilities of the suggestion take more definite shape when we remember Kümmell found that burns of the limbal region were associated with a rise in tension, coupled with a deepening of the anterior chamber. The changes in the same region which are associated with granular ophthalmia may possibly interfere with the normal escape of the intra-ocular fluids. Most of this, however, is but little more than guesswork, and too much stress need not be laid upon it.

(4) **Errors in refraction.**—It has long been recognised that hyperopia is the commonest refractive error met with in eyes affected with primary glaucoma. The deduction has been drawn that the association is more than accidental, and that a condition of hyperopia stands in a causal relationship to the disease. So strongly has this view been held that Fuchs makes the following statement on page 472 of his 4th edition :—"A disposition toward inflammatory glaucoma appears to belong principally to hypermetropic eyes, whereas strongly myopic eyes are to be regarded as having almost complete immunity against the disease." Priestley Smith[4] has challenged the correctness of this view on the grounds that, (1) according to Donders,[5] emmetropic eyes become hyperopic after the fiftieth year; (2) small eyes are not necessarily hyperopic; (3) hyperopic eyes are not necessarily small, and (4) hyperopia is more widely prevalent than either myopia or even than emmetropia. With regard to the first point, the writer feels doubtful of the correctness of the statement made by Donders It is true that hyperopia is not at all infrequently found in elderly patients who have all their life been credited with emmetropia ; the same is true of low grades of astigmatism. It is, however, equally true, that a large number of comparatively young patients, who read 6/6 and over, will be found under a cycloplegic to be hyperopic or astigmatic, or both. This argument cuts both ways, for it raises the percentage of hyperopes in the population, and so discounts the view that long-sight is a predisposing cause of glaucoma. The writer is extremely diffident about putting forward his own views on such a subject, when they appear to be in opposition with what Priestley Smith has found by statistics, but he holds two cherished beliefs as the result of clinical observation, *viz.*, (1) that glaucomatous eyes are frequently abnormally small, and (2) that the type of eye one commonly meets with in hyperopia is likewise small. He cannot support the latter proposition by statistics, but the observations on which it is founded have been so woven into his clinical experience that he finds it hard to let it go. There can be no question that his views are shared by many good clinicians with large experience. He does not quote this as showing they are correct, but merely as putting up a case for further consideration of a difficult and important subject. Views

which appear to support Priestley Smith's contention, and which have been backed by statistics, have been advanced in the last few years.

Apart from fairly numerous instances of individual cases of glaucoma occurring in comparatively high myopes, Gilbert[6] from the statistics of the Munich Clinic, found that of 71 cases of simple glaucoma, 62 per cent. were myopic or emmetropic, and 38 per cent. hyperopic; whereas of 115 cases of inflammatory glaucoma, 77 per cent. were hyperopic, the remainder being equally divided between myopes and emmetropes. He thought the clinical form of the disease to be largely influenced by the state of refraction of the eye. Again, Lange[7] found that 43.3 per cent. of his cases of simple glaucoma occurred in myopes, and Löhlein's[8] researches led him to believe that the myope was just as liable to glaucoma as the emmetrope or hyperope. His statistics showed that in juvenile glaucoma, 50 per cent. of the subjects are myopic. Here, however, we are treading on the question of the relationship of myopia and glaucoma in the young, and of the moot question which of the two is the cause of the other. That must be discussed under another section. In this view, he would appear to be supported by Haag's[9] figures from the Tubingen clinic, for the latter found that myopia was present in a larger percentage of his cases of simple glaucoma than of the congestive form of the disease. It is obvious that what we really need is a mass of trustworthy statistics of the state of refraction in earlier life of those who subsequently develop glaucoma. Such figures cannot easily be obtained from the out-patient records of hospitals, nor will they come in sufficient volume from the private practice of any one man*. It will take time to collect them, but the interest of the subject suggests that it should be done. Even then, the figures will still remain open to some doubt, since it will be extremely difficult to calculate with any degree of accuracy the percentage ratios of emmetropes, myopes, and hyperopes in the *class* of patients from whom the returns come. We are, however, justified in jettisoning the view that the myope is safe from hypertension. It seems to be quite certain that he is not, even though his myopia may be comparatively high. Whether he enjoys a relative immunity is quite another question.

(5) **Mydriasis**—Anything that causes a dilatation of the pupil tends to block up the angle of the chamber, and so, by causing an obstruction to the outflow of intra-ocular fluid, to raise the tension of the eye. We may divide the causes of dangerous mydriasis into a number of headings:—(i) the abuse of drugs; (ii) the exclusion of light from the eye; (iii) the influence of violent emotions; and (iv) the effects of depressing diseases or of allied conditions. We shall take these in turn.—

(i). The abuse of mydriatic drugs. There is no drug which produces mydriasis, which can *safely* be instilled into an eye predisposed to glaucoma, unless the surgeon takes the precaution to neutralise the effect by the subsequent use of a meiotic. Cases are on record in which an access of hypertension has followed the use of each of the following, *viz.*:—holocaine, cocaine, euphthalmin, and homatropin. In one case it was stated that the hypertension occurred in spite of the use of a meiotic. Two important practical points arise out of this last observation, *viz.*: (*a*) that a mydriatic should never be used without first ascertaining the tension of the eye and the condition of the optic disc; unfortunately, although all will admit this to be an axiom the rule is too often broken in practice; and (*b*) that no *doubtful* patient should be allowed to leave the surgeon's care until meiosis has been established; even then he should be provided with a prescription for a mild meiotic to be used at intervals, until all danger is past. The necessity for this last injunction will be obvious when it is stated that the meiosis produced, for instance after the use of homatropin by the instillation of a solution of nitrate of pilocarpin (½ per cent.), will usually be markedly in evidence within twenty minutes of the instillation, but may then gradually pass away, giving place to a mydriasis, which may last for several hours, or even for several days. It is necessary to warn the patient to watch his pupils and to instil the meiotic if need be. This is the more necessary since the mydriasis produced will often long outlast the cycloplegia at which the surgeon aimed. That these instructions are not altogether superfluous may be judged from the fact, that the writer was quite recently consulted by a surgeon, who confessed that he had precipitated an attack of glaucoma by instilling homatropine, in order to examine the refraction of an elderly patient, who had complained of failing eyesight. He had not made an ophthalmoscopic examination before the instillation, as it had not occurred to him that the eye might have been glaucomatous when he first saw it, although subsequent events made it appear probable to him that this was so.

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*In the future it may be possible to obtain such figures from the records of school medical inspection in large urban areas.—EDITOR.

A still graver abuse of drugs is the haphazard instillation of atropine by some general practitoners in all doubtful cases of eye disease. Unfortunately, such cases will not yield to meiotics, and operation must be at once undertaken.

Before leaving the drug question, it must be mentioned that dionine has been accused of causing glaucoma, when used in dangerous cases. It is said by Thienpont,[10] that the action is quite independent of any mydriatic effect, and that the rise is temporary and followed later by a fall. He explains this preliminary rise by the congestion of the ciliary body induced by the mechanical obstruction which the action of the drug places in the way of the vascular escape from the anterior portion of the eye. It has been suggested that when using dioine on doubtfully glaucomatous eyes, a meiotic should first be instilled.

(ii). The exclusion of light from the eye is an obvious source of mydriasis. It is well-known that an operation for glaucoma on one eye may be followed by the onset of the disease in the opposite, previously unaffected eye, whilst the two are bandaged. This may be in part attributed to the mydriasis induced by the exclusion of light, but it is also at least in part to be set down to the mental shock of the operation, and to the anxiety the patient is necessarily suffering. Nor should the enervating effect of the pain that has been endured before the operation be left out of count. Grönholm[11] who studied the influence of mydriasis and meiosis on the tension of the eye, concluded that the filtration channels are opened by the act of accommodation, and by contraction of the pupil, and suggested that glaucoma patients should be advised to stay as much as possible in a bright light, and to read, so long as they have any accommodatory power, and as their pupils contracted under the influence of light. Arthur Thomson[12] working independently at the very same time (1911), and approaching the subject from the purely anatomical point of view, came to precisely similar conclusions. He showed reason to believe that the ciliary muscle and the sphincter iridis, by their contraction, pull on the scleral spur, and in conjunction with the elastic force of the pectinate ligament establish a pump action, whereby the intra-ocular fluid is kept on the move outward. His recommendation was that in glaucomatous cases, the action of the ciliary muscle should be restored by suitable exercises. The main interest for us is, that his communication added an element of scientific precision to the astute clinical advice given by Grönholm, when the latter pointed to exercise of the eyes by daylight as being calculated to remove, or at least to lessen, one of the ætiological factors of high tension.

F. P. Maynard[13] observed that more cases of glaucoma were under treatment during the rainy season in the Calcutta Hospital than at other times, and was inclined to think that the considerable diminution of light which characterises the cold weather in India was responsible for the development of the seasonal increase in cases of hypertension. The idea seemed so attractive that the writer endeavoured to follow it up in Madras. He was, however, quite unable to find any greater seasonal prevalence of the congestive disease (which obviously is alone in question) after spells of dull weather. The influences which regulate the numbers in which Indians resort to hospitals at different seasons, and the often inevitable delays which take place in the East in bringing what we should recognise as very urgent cases for surgical relief, are amongst the factors which made it quite impossible in Madras, at least, to trace any such influence as Maynard suggested. It is, however, recognised that this evidence is altogether on the negative side, and that the suggestion under discussion may yet prove to be well founded. A similar observation has been made that glaucoma is more frequent in London during the winter. Before accepting the diminution of light as the causal factor in this, it is necessary to take account of cold, wet, privation, and other causes of exhaustion which are always present in the winter season in any large northern town.

Nerve shock and strain. – We have had frequent need in the preceding pages to refer to the *rôle* which nerve shock and strain play in exciting an attack of glaucoma in a subject, whose eye is anatomically predisposed thereto. Every surgeon knows that any condition which leads to powerful mental excitement, or to exhaustion of the mind or body, is to be numbered amongst the exciting causes of the disease. Many of such patients will give us a history of family bereavement, of haunting fear, of business anxieties, of long, fatiguing, and anxious night watches, of prolonged mental overwork, of sleeplessness, or of some similar condition or set of conditions, the essence of which is a tendency to nervous exhaustion. Nor must we leave out of our reckoning those cases in which the second eye becomes glaucomatous whilst the patient is in hospital for operation on the first, for these point most instructively to the nature of the agency at work. This is really two-fold, *viz.*, (1) some one or more of the tendencies to ocular congestion, and (2) the influence of mydriasis. The former we have discussed at length under a previous section. Of the latter, it is necessary to point out that its genesis may again be two-fold, for it may be caused either by strong mental impressions, by nervous exhaustion, or by the shutting off of light from the eyes by means of the bandage.

Febrile diseases.—To those who accept what has been written in the previous section, it can be a matter of no surprise that glaucoma should from time to time be met with after various febrile diseases, and under circumstances which appear to justify our assuming that here cause and effect are in operation. The weakening of the heart's action, and the demoralisation of the vasomotor tone with which we are familiar under such conditions, afford us all the explanation we need. But, there is another side to the question. In many infective diseases we are accustomed to find evidence, in certain cases, of the influence of the responsible organisms far from their accustomed and well-recognised areas of activity, and it is therefore in accordance with what we know of pathology, that the eye should sometimes be so attacked by these outlying expeditionary forces of disease. Bacterial or toxic mischief introduced into the system in this way may seriously affect either the vascular arrangements of the eye, or the integrity and potency of the excretory passages. Nor is it impossible that the secretory activity of the ciliary body may be pathologically augmented in certain cases, or even that the chemical composition of the excreted fluid may be so altered as to oppose a barrier to its free excretion. Lastly, it is conceivable that the morbid conditions we are describing may favour that presumed state of hydrophyllism, on which Fischer and his followers lay so much stress. It is in the light so presented that we must look on the records of association between glaucoma and influenza, as recorded by Fuchs,[14] Menacho,[15] Verderame,[16] and others, between it and epidemic dropsy, as noticed by Maynard,[17] or between it and herpes zoster, as observed by Dubois.[18]

Injuries.—It is a well known fact that an injury, and sometimes a very slight one, either of the eye or of the head, may appear to be the determining cause of an attack of glaucoma. We are not considering now the cases, which would ordinarily be grouped under the heading of secondary glaucoma, and in which some coarse lesion of one or other of the ocular structures can be demonstrated. The *modus agendi* in these latter cases is simple enough. It is a much more difficult matter to explain why a blow on the head, not necessarily a severe one, should excite an attack of high tension, or why glaucoma should result from a slight abrasion, burn or other injury of the cornea or of the limbal region. We can only adopt the time honoured suggestion, that we have here to do with an interference, probably vasomotor in nature, with the normal circulation of the eye. As has already been said in another section, we know so little of the nervous mechanism of the intraocular circulation that the above cannot be claimed to be more than a guess. It is, however, as far as the present state of our knowledge permits us to advance.

REFERENCES.

1. **Smith, Priestley.**—"Glaucoma." London, J. & A. Churchill, 1891, p. 94.
2. **Laqueur, L.**—*Klin. Monatsbl. f. Augenheilkunde*, June, 1910, p. 630. ("Ophthalmic Year Book," 1910.)
3. **Lawford, J. B.**—*Royal London Ophthalmic Hospital Reports*, Vol. XVII, p. 57.
4. **Smith, Priestley.**—*Loc. cit.*, p. 122.
5. **Donders.**—"Accommodation and Refraction of the Eye," English edition, p. 208.
6. **Gilbert.**—*XXXVIII Ophthalmic Congress*, Heidelberg, p. 333, 1912.
7. **Lange, O.**—*Klin. Monatsbl. f. Augenheilkunde*, Vol. L.
8. **Löhlein, W.**—*XXXIX Ophthalmic Congress*, Heidelberg, p. 97, 1913.
9. **Haag, C.**—*Klin. Monatsbl. f. Augenheilkunde*, Vol. LIV, p. 133.
10. **Thienpont.**—[illegible], Vol. VIII, p. 97.
11. **Gronholm, V.**—*Klin. Monatsbl. f. Augenheilkunde*, Vol. LXVI, p. 340, and Vol. LXVII, p. 130. ("Ophthalmic Year Book," 1911.)
12. **Thomson, A.**—THE OPHTHALMOSCOPE, 1911, p. 470.
13. **Maynard, F. P.**—THE OPHTHALMOSCOPE, 1908, p. 804.
14. **Fuchs.**—"Text Book of Ophthalmology," 4th edition.
15. **Menacho, M.**—*Arch. de Oft.*, Vol. XIV, p. 500. ("Ophthalmic Year Book," 1914, p. 502.)
16. **Verderame, F.**—*Ann. di Ott.*, Vol. XLIII, p. 772. ("Ophthalmic Year Book," 1914, p. 523.)
17. **Maynard, F. P.**—*Indian Medical Gazette*, Nov., 1911.
18. **Dubois.**—*Klin. Monatsbl. f. Augenheilkunde*, May, 1912, p. 601.

THE END.

A NOTE ON SPONTANEOUS HÆMORRHAGE FROM THE CONJUNCTIVA.

BY

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ALTHOUGH a spontaneous external loss of blood from an eye is a very uncommon symptom in ophthalmic practice, yet by chance within the past two years a couple of patients so affected have come under my care—a woman and a young girl. To the former I shall refer cursorily later, and to the latter, being of peculiar interest, in detail below:

Summary.—Case of a girl of 12 years, a pupil at a private boarding school, who had two attacks of bleeding from the right eye with an interval of two months between. The hæmorrhage, of about two drachms in quantity, and venous in type, arose from a localised hyperæmic area of the conjunctiva and episclera in the neighbourhood of the lower fornix. On a third occasion the appearances were clinically identical, but no bleeding took place. Premonitory œdema of the lids set in on the preceding day before all attacks. Wilful traumatism excluded. Apparent relation to the catamenia. This affection was possibly of the nature of Episcleritis periodica fugax.

Miss Vera B , aged 12 years, consulted me on March 31st, 1914. The history, as given by the school matron, was: "The eyelids of the right eye and the eye itself became slightly red, swollen, and a little painful yesterday morning. She did her school work as usual and slept well last night. This morning, whilst writing at her desk, the eye began to bleed. I tied the eye up and made her lie down until ready to bring her; when I removed the handkerchief, a big clot, which filled the eye, came away. As her parents live in Japan, she spends the holidays at school, and during this last Christmas holiday she had a slighter attack of bleeding from the same eye." On further enquiry, it appeared that the day preceding the trouble in the holidays the eyelids were puffy and the eye inflamed. The class mistress and the matron are quite sure that there has been no injury.

Present condition.—Right eye: the lids are a little œdematous. On the conjunctiva there is a dusky redness over a small area (which corresponds to between the 5 and 7 of the clock face), situated partly over the globe and partly over the fornix. Close to the surface is a collection of dilated venules, and on one of these is a small coagulum. (I saw the child half an hour after the event.) Deeper than this, the episcleral tissue is swollen and injected. On palpation through the lower lid, a nodular swelling is detected by the finger, and there is some complaint of tenderness. A foreign body is not present, nor is there any discharge or photophobia. In other respects the parts of the eye visible to inspection are healthy, and the pupil reacts normally. R. V. = 6/12; under homatropine + 2.25 D. sph. = 6/12. Media clear. The retinal veins present a normal appearance, but the arteries are very glistening, as though from perivasculitis. This is so marked in the superior temporal and its branches that the pink colour cannot be seen. There are two small longitudinal (?) hæmorrhages near the inferior retinal artery. The left eye is quite normal in every way, with a visual acuity of 6/9; hypermetropia of 2 D. under homatropine. The visual fields in both eyes show a concentric contraction of about 7 to 10 degrees, but no sector defects.

General Condition.—She looked, and from examination appeared to be, a healthy child in every way; no cough or nasal disease; tongue clean, bowels regular, and teeth well cared for. Urine free from albumin and sugar. Menstrual flow appeared a month ago for the first time, and was physiological.

Progress.—April 3rd, 1914. The parts are quite healthy and there is no evidence of an hæmangioma; no breaking-down of tissue has occurred. The fundus appearance is *in statu quo.* The catamenia has been missed. May 30th, 1914, a recurrence of a similar nature at the same site in the right eye, but without bleeding. This lasted two days and commenced on the second day of her period.

She was not seen again, as she left the school to join her parents.

Diagnosis.—In such a condition the question naturally arose as to whether a wilful injury had been the causative factor. This, however, was readily excluded by the testimony of the matron and the class mistress, as also that signs of inflammation and œdema preceded the attacks. Likewise the docile demeanour of the child was against such an origin. The close similarity of the clinical picture, with the exception of the hæmorrhage, to episcleritis periodica fugax has already been mentioned, and this likeness was further borne out by the third attack occurring without a hæmorrhage.

Treatment.—None was required.

Remarks.

A spontaneous external hæmorrhage from any of the mucous surfaces in the body is a common symptom of many general and local affections, but the conjunctiva is the marked exception. Here hæmorrhage does occur, but it takes place into the substance of the membrane, or even deep to it (as may be the case with the other mucosas), and very seldom breaks through to lead to actual loss. The explanation is no doubt to be found in:—(1) the support provided by the lids; (2) the character of mucosa itself, for there is very little loose stroma, whilst the submucosa consists of a loose elastic layer; and (3) the plexus of veins is found only at the fornices.

The commonest cause of external hæmorrhage from the conjunctiva is that due to direct traumatism, and this not being spontaneous, does not concern us here. A. Hubbell, Pomeroy, and de Schweinitz have recorded cases of severe and persistent hæmorrhage—almost to a fatal degree—in newly-born babies the subject of ophthalmia neonatorum. These, however, were really instances of direct trauma, as they were due to the too vigorous application of silver nitrate. Other cases are due to the presence of hæmangioma or of fibroma, and in these the bleeding is usually small in amount, producing the so-called "bloody tears." In a young woman of twenty-seven years, whom I recently saw, the first indication of the trouble for which she consulted me was a bleeding from the right eye, sufficient in amount to soak two handkerchiefs. This recurred on several occasions. By inspection, the eye looked normal and there was no swelling visible, but on everting the upper lid, a very thin, flat fibroma, half the size of a sixpence, came into view. It was attached by an exceedingly thin pedicle only, which did not bleed when it was cut through. At the anterior end of the growth there was a hæmorrhage just below the surface.

F. C. Layson has reported a severe hæmorrhage from the conjunctiva in a patient during an attack of typhoid fever, and others during the menstrual periods. There seems little doubt that the case of the child Vera R. belonged to this latter category. The first attack antedated by about a month the beginning of the menstrual function; the second occurred about a month after the first catamenial period, apparently taking the place of her second period, which was missed ; and the third attack—unassociated with loss of blood—took place during a normal physiological menstrual flux.

Locally, nothing was to be observed as to why the right eye should have been affected more than the left, or why only a small area of the conjunctiva was involved. And it is evident that a localised and acute hyperæmia, such as was present in the case under discussion, must arise through a relaxation of the vaso-motor nervous control, either through some toxin, or, more probably, through a disturbed central nervous system, the result of the recently developed uterine function. One sees a somewhat analogous state of disturbance in the vaso-motor control, giving rise to tiny, acute, ephemeral chilblains on the back of the hands and ears—analogous, that is, in the clinical aspects of the affection.

The clinical features of this case, including the prodromal swelling of the lids, were very like that of episcleritis periodica fugax, and it is possible that this was an atypical attack. However this may be, it would seem that, given an intense hyperæmia situated in the conjunctiva and episclera, at the transition to the fornix, where there is a plexus of veins (Fuchs), a resultant hæmorrhage would not be an entirely unexpected event.

REFERENCES.

Layson.—Abstract in THE OPHTHALMOSCOPE, August, 1915, p. 389.
Hubbell.—*American Journal of Ophthalmology*, 1906.
Pomeroy. *Medical Record*, New York, 1887.
de Schweinitz. *Ibid.*, 1891.

CLINICAL MEMORANDA.

HETEROCHROMIC CYCLITIS WITH CATARACT.

BY

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T.T., a Civil Servant, age 41 years, met with an accident in 1901, which necessitated bandaging of the right eye. Then, for the first time, the patient noticed a floating speck before the left one. Nine years later, the floating bodies before this eye had become so conspicuous that T.T. visited an ophthalmic surgeon. The right eye, meanwhile, had not given rise to any symptoms whatever, and in November, 1915, when the patient consulted me, this eye showed no pathological appearances and possessed full vision, 6/6. The left eye could, at that time, merely distinguish light from darkness ; there were numerous fine punctate deposits on the posterior surface of its cornea ; the pupil was wider than the pupil of the unaffected eye and the iris, of a light-blue colour, formed a striking contrast with the greyish-brown iris of the right eye. The left lens was cataractous and homogeneous in appearance.

Combined extraction was performed, attended by escape of very fluid vitreous. Fortunately, the pillars of the coloboma were in good position on the following day, and no untoward event interfered with satisfactory healing. Three weeks after operation, I instituted a course of subconjunctival injections of sodium chloride, 4 per cent. The course was continued for three weeks. To-day the vision of the operated eye is, with optical correction, *viz.*, $+ 9.5$ D. sph. $\bigcirc$ $+ 2.5$ D. cyl. 15° 6/9. The punctate deposits are fewer in number. There are still floating threads in the vitreous.

Syphilitic infection is denied ; the Wassermann reaction is negative. The contrast in colour of the eyes had been noticed by the patient's wife in 1906, the year of their marriage. Up to then, the patient had been unaware of the condition.

A feature of interest in my case is, that about ten years ago, patches of baldness developed quickly on the scalp, but, after using a hair lotion, the bare patches become covered with white hair. This condition has persisted.

CASE OF DYSPITUITARISM IN A GIRL, AGED FIFTEEN YEARS.*

BY

SYDNEY STEPHENSON, C.M.,

LONDON, ENGLAND.

H. C., AGED 14 years. First attendance, Queen's Hospital for Children, London, July 9th, 1914.

The girl was brought with the complaint that the sight had been failing for three or four months, and that for one week she had suffered from headaches. Right vision, 5/5 and J.1. ; left vision, 5/36 and J.1. Weak atropine drops (1 gr.) were prescribed to be used to each eye three times a day, and when the girl was examined the following week she was found to have in the right eye + 0·5D. cyl., axis 180°, and in the left eye + 0·5D. sph. A note was made to the effect that the media were clear.

I first saw the patient on August 27th, 1914, and found that the sight of the right eye had become reduced from normal to "shadows," while that of the left eye remained as it was on admission some seven weeks before—namely, 5/36. The sight of the right eye was stated to have failed suddenly two weeks ago. The pupil of that eye had lost its direct response to light. The media were clear. Both optic discs were pale, but the retinal vessels were of normal dimensions. The girl's personal appearance was somewhat peculiar, since she was inclined to stoutness and her eyes seemed rather prominent.

For closer observation, the patient was admitted to the Hospital on August 27th, 1914, and remained until the following October 24th. She was found to be a bright, intelligent, good-natured girl, whose every movement appeared to be normal. There was no tremor or alteration in sensation. The facial movements were normal, and there was no nystagmus. The functions of all the cranial nerves, with the exception of the second, were normal. During her stay in Hospital there were occasional headaches, but no vomiting or vertigo. Successive weights during the two months' stay in Hospital were: 79 lb., 79 lb., 79 lb. 10 oz., 81 lb., 80 lb. 4 oz., 80 lb. 8 oz., 80 lb., and 74 lb. 4 oz. The temperature was usually between 98° F. and 99° F. ; but on thirteen occasions during her sojourn it rose to between 99° F. and 100° F.

An examination of the blood, made a few days after admission, gave the following results : red blood corpuscles, 3,770,000 ; white blood corpuscles, 6,400 ; hæmoglobin, 65 per cent. ; index, 0.86. The differential count was :

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[*] Patient exhibited January 28th, 1916, before the Section for the Study of Disease in Children : Royal Society of Medicine.

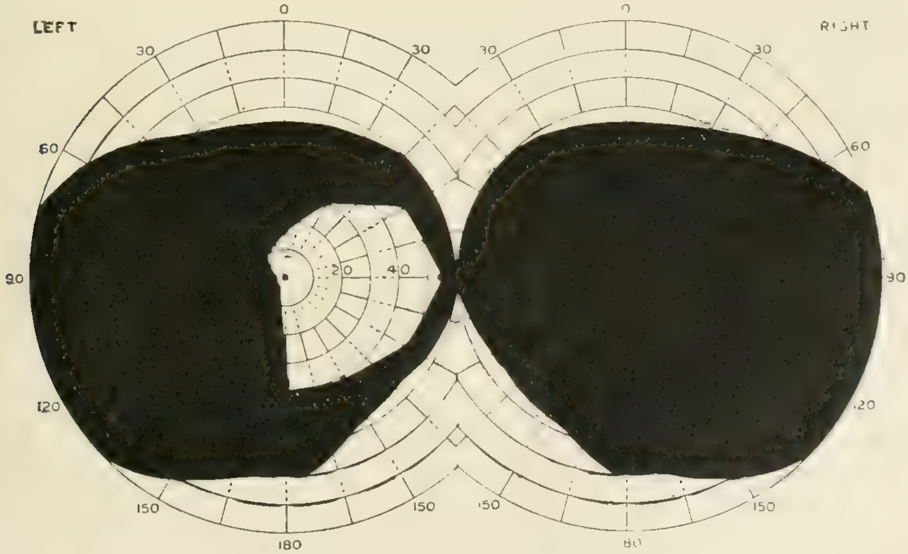
Neutrophiles, 55; basophiles, 1; eosinophiles, 2; large lymphocytes, 9; small lymphocytes, 29; hyalin, 4; total, 100.

The knee-jerks were brisk; there was slight ankle-clonus. Flexor plantar response. The abdominal reflexes were present; the reflexes of the upper arm were easily elicited. No jaw-jerk. No facial irritability. The Wassermann reaction negative as regards both the blood serum and the cerebrospinal fluid. No increase of pressure in the cerebrospinal fluid, which, from other points of view, was normal. The sphenoidal and other sinuses were reported as normal.

The girl was next seen by me on May 13th, 1915—that is to say, after an interval of almost nine months—when sight remained much as it had been on the date of the last note. The optic discs were pale, with no evidences of antecedent neuritis. The retinal vessels were of good size. The field of vision of the right eye could not be taken; but that of the left eye, estimated for a small white object, was restricted in the temporal region, although tolerably full elsewhere.

Soon after this (June 17th, 1915), a note was made to the effect that no pubic hair was present, and that the girl had not begun to menstruate.

She was placed on thyroid extract, 1 gr. twice a day. A negative report was received at about this time respecting an X-ray examination of the patient's skull.



Field of Vision for a 10 mm. white square taken on December, 4th, 1915.

September 9th, 1915.—Right vision, perception of light; left vision, 3/60. Dose of thyroid increased to 4 gr. a day.

October 7th, 1915.—Left vision, 3/60, No. 20 J.

December 4th, 1915.—The bright and intelligent girl has a peculiar personal appearance, and is something more than merely well nourished. Her eyes convey the idea of prominence, and the left eye turns slightly outward and upward. Although within a few weeks of fifteen years of age, no signs of menstruation have yet made their appearance. No headache, vomiting, or vertigo. Pupils 6·5 mm. in diameter. Direct action of the right pupil almost lost, while that of the left one is as yet nearly intact. A very slow hippus is present. The optic discs are pallid, well-defined, and the physiological cups are not filled in or concealed in any way. Retinal vessels of good size. The visual field of the left eye, as tested for a 10 mm. white square, is entirely confined to the nasal half. The fixation point is as yet intact. Right vision, ? perception of light ; left vision, 1/24 (letters) and No. 18 J (letters).

A report from Dr. Williams, radiographer to the Queen's Hospital, states : "The sella Turcica is greatly enlarged, the antero-posterior diameter being 17 mm. There appears also to be some thinning of the clinoid processes."

Comments.

The diagnosis of "dyspituitarism" can be made with tolerable confidence, seeing that the following points are present : (1) The existence of bilateral simple optic atrophy, otherwise unexplained : (2) loss of the temporal field in the left eye (temporal hemianopsia) ; (3) X-ray evidence of enlargement of the sella Turcica ; and (4) the general appearance of the girl.

As to treatment, large doses of thyroid have been tried, but apparently without particular benefit. It would appear that nothing short of surgical treatment is likely to do good, a point upon which expressions of opinion are requested from the Section. The risk of impending blindness is, in itself to my thinking, ample justification for such a suggestion.

TRANSLATION.

A METHOD OF ENUCLEATION.*

BY

E. VALUDE,

PARIS, FRANCE.

Before the war I practised enucleation in the following way :

By means of a handle of strong thread passed through the cornea and held in the left hand, I drew the eyeball, thus firmly held, forwards. I was able to turn it in all directions with extreme facility, and to cut the muscles one after the other.

This method, which surpassed all others in simplicity, was criticised only by the pathologists, who protested against a thread being passed through the cornea. At the same time it is rare that the cornea of an enucleated eye is the point chiefly concerned in anatomico-pathological researches.

War has brought us, among the many cases of enucleation, eyeballs absolutely mangled, burst, presenting themselves in inchoate fragments.

The injury is complicated with such lesions that it would be out of the question to insert a thread and to execute a correct enucleation in the usual way.

In the first of these cases I took Museux's forceps meant for laying hold of tumours, and I grasped in its claws the remains of the ruptured eyeball. The operation was thereby accomplished very readily.

The experience led me to systematize this method, and this is how I now execute enucleations, all enucleations, even of entire eyeballs :

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* [illegible]

Three instruments suffice: a speculum, forceps with large claws, and strongly curved scissors.

The speculum being in position (or better, the eyelids being held apart by an assistant with Desmarres' retractors), I seize the eyeball in the horizontal diameter with forceps, of which the claws are placed on each side of the cornea in the neighbourhood of the limbus. The instrument is held in the left hand.

For this purpose I employ a small catch forceps with large claws modelled after those of Museux, but which do not meet so completely as to tear the cornea. They are made by P. Moria, 108, Boulevarde St. Germain, Paris.

The forceps in position, with *very strong* curved scissors, I circumscribe the cornea by rapid section of the mucous membrane within two or three millimetres of its limits.

Then, and without the aid of any other instrument, I attack the insertion of the external rectus, the position of which is shown very plainly by traction on the eyeball firmly held in the grip of the forceps.

The muscle is cut, and by the breach thereby effected I divide the optic nerve.

Nothing now remains except to place the scissors with one blade externally and the other in the depths of the tissues, and to divide from behind forwards the remaining muscles and the fibro-mucous attachments of the eyeball.

The operation does not take longer than one minute to perform, and the muscles are perfectly divided on a level with their insertion into the sclerotic. I may add that I have often executed the operation in twenty-five seconds by the clock. This last consideration is not without its practical utility, inasmuch as it allows enucleation to be undertaken by the aid of a simple whiff of ethyl chloride.

CURRENT LITERATURE.

NOTE.--Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—ANATOMY.

(1) **Verderame, Ph.**—The sensibility and nerve endings of the cornea of newly born infants. (Sensibilität und Nervenendigungen in der Kornea des Neugeborenen.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(2) **Lindenfeld, Berta.** — The formation of rosette-like figures in the retina of otherwise normal fœtal human eyes, (Ein Beitrag zur Bildung rosettenartiger Figuren in der Netzhaut sonst normaler fötaler menschlicher Augen.) *Klin. Monatsbl. f. Augenheilkunde*, April, 1915.

(3) **Snead, C. M.**—Congenital division of the optic nerve at the base of the skull. *Archives of Ophthalmology*, July, 1915.

(4) **Finnoff, W. C.**—The ciliary glands. *Archives of Ophthalmology*, November, 1915.

(1) **Verderame**, of Turin, finds that although the newly-born infant has no corneal sensibility or reflex, and does not, as a rule, develop this function until it is about four months old, yet all the nerve endings are fully developed at birth just as in the adult cornea. Although the anatomical apparatus is present, function takes time to develop. A useful plate shows the histology of the nerve endings in the cornea. T. HARRISON BUTLER.

(2) **Berta Lindenfeld** describes and illustrates the findings in two cases. The first, a fœtus of five to six months, presented rosette-like collections of cells in the retina in the neighbourhood of the optic nerve, and the other, a seven or eight months fœtus, showed in the region of the ora serrata a folding of the external nuclear layer of the retina and some small collections of undifferentiated cells. In considering the significance of these changes, the authoress discusses the possibility that they may represent the early stage of retinal glioma, but decides against this supposition. Another possibility is that they were the result of the action of the X-ray treatment, which had been applied to the mothers, in order to produce sterility.

A. J. BALLANTYNE.

(3) **Snead**, of Jefferson City, records, with an excellent illustration, a case in which the right optic nerve was found to divide into two parts at a distance of 6 mm. in front of the chiasm. The nasal division was the larger; the two re-united near the eyeball to form an apparently normal optic nerve. The author has been able to find accounts of three similar cases which have been previously published. In all of these the isolated bundle followed the anatomical course of the uncrossed optic nerve fibres, and in two of them it could be traced as a separate bundle from the geniculate body to the optic nerve of the same side. In the present case it was not possible to isolate the strand any further back than the chiasm.

R. H. ELLIOT.

(4) **Finnoff**, of Denver, has taken the ciliary glands as the subject for his thesis for the degree of Doctor of Ophthalmology in the University of Colorado.

He first enters at some detail into the development and microscopic anatomy of the ciliary body. In this connection, it is interesting to notice that he accepts and endorses the time-honoured view that the circulus arteriosus major is arterial in function. This view is contrary to that put forward by T. Henderson,* but is, we believe, the one usually held by ophthalmologists. He next passes on to discuss the glands described by E. Treacher Collins. His conclusions may be summarised in his own words:—"The presence of the so-called glands of Treacher Collins is doubtful, and when seen with a lumen, these are probably artefacts. The aqueous humour and nutrient fluid of the vitreous are probably secreted by both the layers of epithelium, which cover the ciliary body from the ora serrata to the root of the iris. The pigment epithelium probably plays the most active part because of its location. It is close to large and numerous blood channels. The serum is probably partially changed by the outer layer, and completed by the inner non-pigmented epithelium in the normal eye." These views are necessarily speculative.

The paper is illustrated by a number of micro-photographs. It is interesting and obviously honest, and is evidently the outcome of careful and painstaking work, but the reviewer's impression is that it does not carry our knowledge of the subject much further forward than it was before. R. H. ELLIOT.

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II.—GLIOMA OF THE RETINA.

(1) **Deutschmann, F.—On an atypical retinal glioma. (Ueber ein atypisches Netzhautgliom.)** *Zeitschrift für Augenheilkunde*, March, 1912.

(2) **Purtscher, O.—A contribution to our knowledge of glioma of the retina and of its spontaneous retrogression. (Zur Kenntnis des Markschwamms der Netzhaut und seiner spontanen Rückbildung.)** *Centralbl. f. prak. Augenheilkunde*, November-December, 1915.

(3) **Paparcone, E.—Retinal glioma in a boy aged 13 years.** *Lancet*, January 29th, 1916: abstract from *Lo Sperimentale*, Florence, 1915, Vol. LXIX, page 855.

(1) F. **Deutschmann**, of Hamburg, describes a glioma which originated in the retinal pigment cells, a most unusual site. The child had a glioma-like mass in both eyes, but double enucleation was refused by the parents. Under an energetic mercurial course, with the help of sodium cacodylate and injections of tuberculin, the mass in one eye almost disappeared; that in the other eye developed typically, and the eye was removed.

T. HARRISON BUTLER.

(2) It is recognised that in extremely rare cases glioma of the retina may undergo, without coincident shrinking of the eyeball, a retrograde metamorphosis. Such cases have been reported, among others, by Wintersteiner, the younger Deutschmann (see above), Axenfeld, and Meller.

This purely clinical communication by **O. Purtscher**, of Klagenfurt, relates two examples of retrogression occurring in members of the same family.

The family described by the author consisted of eleven members: six boys, and five girls. The parents were healthy, although it may be noted, as a point of some little interest, that the father succumbed to recurrent sarcoma of the thorax. Of the eleven children, two boys and one girl were affected with bilateral glioma, which proved fatal in the two boys. The youngest girl but one (herself unaffected) had a family of two boys and one girl. Both the boys suffered from glioma, and one succumbed. There were, then, five instances of glioma in two generations of the family. This family predisposition is interesting enough, but that two out of the five cases should manifest retrograde metamorphosis of the retinal growths, is a fact surely almost unique in the literature of ophthalmology.

The facts of the two cases are given briefly below:—

1. Josepha, a member of the first generation, was first examined in 1907, at about the age of twenty years. She had seen badly with the left eye in childhood, and had suffered from severe headaches. The sight of the left eye was reduced to fingers at ¾ metre temporally, and this was found to be due to a large sharply-bounded white area, with Vandyked edges, in many places pigmented, situated upwards, outwards, and below the optic disc. The diagnosis appeared to lie between choroiditis and a neoplasm. When examined in 1914, L.V.=fingers outwards. The eye was rather markedly prominent. The media were clear. A peculiar ophthalmoscopic picture was present.—The outer part of the fundus was occupied by a yellowish-white shining area, measuring 4 to 5 papilla diameters in vertical and horizontal directions. There were areas of atrophied choroid, and the fundus to the outer side was pigmented. In 1915 the patient was recommended to

the Fuchs' clinic in Vienna, where the diagnosis of glioma was confirmed. A small atrophic area was, furthermore, then found to be present in the woman's right eye.

2. Karl, a nephew of the foregoing patient, was four years of age when first seen. The left eye had a convergent squint, and sight was equal to fingers eccentrically. The ophthalmoscopic findings were quite peculiar, and outside Purtscher's experience. A yellowish-white mass, looking almost as if dropped into place and slightly prominent, occupied the macular region. In its neighbourhood and between isolated white areas there was a good deal of scattered fine pigment. A suspicion was aroused that it might represent an arrested gliomatous process. At Fuchs' clinic in Vienna (whither the patient was referred) this supposition was confirmed, and it was also pointed out that in the right eye there were ophthalmoscopic evidences of a similar retrogression having taken place. SYDNEY STEPHENSON.

(3) *The Lancet* refers to a case reported by **Paparcone** which is alternatively described by the author, after microscopic examination, as endophytic glioma of the retina with metastasis into the vitreous, neuro-epithelial glioma, gliosarcoma, or glioma sarcomatodes. The curious point about the case is that the tumour appears to have developed as the direct result of a trauma, the boy having struck the eye against the branch of a tree one month before coming under observation.

Paparcone has found a single case like his own in the literature, but is unable to say how trauma can give rise to such a tumour.

ERNEST THOMSON.

PATHOLOGY.

(*Second Notice.*)

(1) **Greeves, R. Affleck.—A contribution to the study of the microscopical anatomy of ocular syphilis, illustrated by three cases.** *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 277.

(2) **Komoto, Gunjiro.—The pathological anatomy of the retina and choroid after complete and partial removal of their respective blood supplies.** *Trans. Ophth. Society U.K.*, Vol. XXXV, 1915, p. 295.

(3) **Derby, George S.—Massive granuloma of the sclera (Brawny Scleritis), with the report of an unusual case. Pathologic examination by F. H. Verhoeff.** *Trans. Amer. Oph. Society*, Vol. XIV, Part 1, 1915, p. 110.

(4) **Mawas, Jacques.—Researches upon the structure and the histochemistry of the white areas in albuminuric retinitis. (Recherches sur la structure et l'histo chimie des plaques blanches de la rétinite albuminurique.)** *Annales d'Oculistique*, février, 1916.

(1) An elaborate pathological account by **Greeves**, of London, on three cases believed to be of syphilitic origin, *viz.*, (1) old interstitial keratits, (2) granuloma of the iris mistaken for a melanotic sarcoma, and (3) scleritis and choroiditis. SYDNEY STEPHENSON.

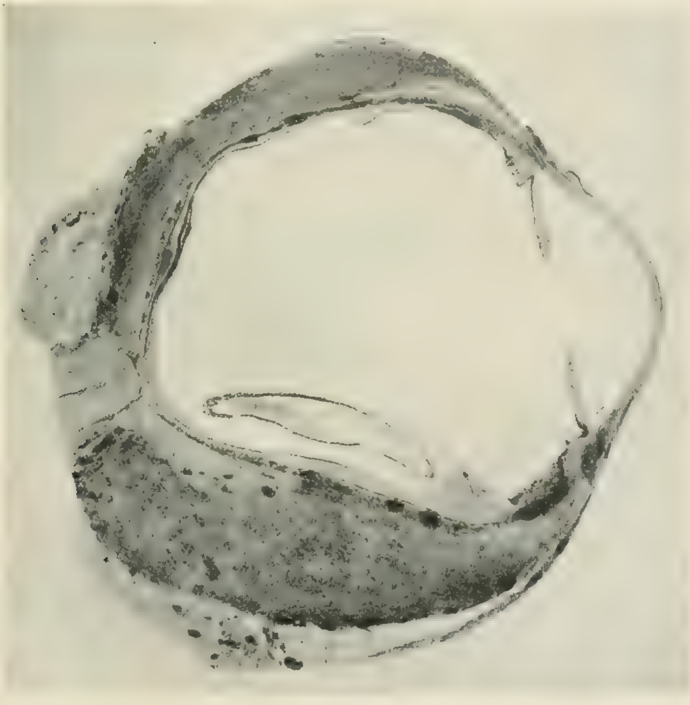
(2) By a happy chance, **G. Komoto**, of Kagoshima, Japan, obtained possession of an eyeball enucleated twelve days after the optic nerve and posterior ciliary vessels had been divided.

The more important anatomical changes were as follows.—The retina (detached in parts) near the optic disc was reduced to a swollen and necrotic mass, while anterior to the equator the tissues became more nearly normal. Retinal vessels empty. No evidences of inflammation. The pigment layer was depigmented and degenerate, changed here and there into spindle-shaped cells, and proliferated into the retina as larger or smaller masses. Choroid, in general, much atrophied. Near the optic disc its degenerate chromatophores were replaced by round or oval clumps of pigment. The nerve fibres of the optic nerve had disappeared. Proliferation of neuroglia in optic nerve and optic disc. Posterior ciliary vessels more or less obliterated by new-formed fibrous tissues, in places undergoing hyaline degeneration. Thrombosed vessels, undergoing hyaline degeneration and absorption, at the posterior pole on the outer side between the equator and the optic nerve.

The relative absence of changes in the anterior part of the retina leads Komoto to surmise that the nutrition of that part of the retina must be largely provided for by the choroidal system. The changes in the pigment layer are to be attributed to interruption of the posterior ciliary arteries, rather than of the central artery of the retina, for in animals Wagenmann and Hertel found the pigment layer to remain normal after division of the last-named.

SYDNEY STEPHENSON.

(3) In a case by **Derby**, of Boston, Mass., a female, 34 years of age, sought relief from scleritis of one eye, which had been similarly inflamed twice during the previous five years. There was considerable injection of the vessels of the ocular conjunctiva, but nodules were not noted. Vitreous opacities.



Massive granuloma of sclera. The lens has been removed. Note lymph-follicles in choroid and orbital tissue. Also exudate on pars plana ciliaris below. (Photo × 4. Reduced one-fourth).

View of fundus could not be obtained. V. = 20/200. Tension normal. No excess of uric acid in blood. Specific tests (Wassermann and old tuberculin) negative. Some three months later, there was no nodular thickening of the sclera, and the eye condition did not suggest a tuberculous scleritis. There was enormous tortuosity and enlargement of the episcleral veins, Descemetitis, and vitreous opacities. Tension sub-normal. Five weeks after this note was made, the retina was found to be detached downwards, and since transillumination over this area was faulty, it was thought that an intra-ocular tumour might be present, and the affected eye was removed.

The globe measured 30 mm. antero-posteriorly, 26 mm. horizontally, and 26 mm. vertically. The sclera was everywhere thickened, except for a few millimeters immediately behind the limbus. The greatest thickening, however, was posterior to the equator, in the lower-outer quadrant, where it formed an ill-defined nodule, 20 mm. to 27 mm. in diameter and 13 mm. thick (see figure). The thickened tissue was very firm and slightly grayer in appearance than normal sclera.

While the pathological examination of the case furnished no conclusive evidence with regard to the cause of the condition, it appeared to exclude tuberculosis and all known infective processes except syphilis. From the histological examination alone a scirrhous lymphoblastoma could not be entirely put on one side, although it is improbable that such a tumour would arise from the sclera. The essential details of the pathological examination follow.—The sclera was everywhere affected, least so near the limbus, by granulation tissue rich in plasma cells, associated with which was an abundant formation of dense connective tissue derived from it. Occasional eosinophiles and a few lymphocytes. No giant cells. Obliterative endarteritis was a pronounced feature: it was difficult, indeed, to find an artery in the tissue that was not collapsed or completely obliterated. A few small areas (the largest being 0.25 mm. in diameter) were present, infiltrated with pus cells, and some of these areas showed definite caseation. The conjunctiva and episcleral tissue (at least such as remained for examination) were œdematous and markedly infiltrated with plasma cells, and slight endarteritis was present in some of the vessels. The remaining changes, which included localised infiltration of the cornea with granulation tissue and plasma cells, precipitates on the posterior surface of the cornea, infiltration of the ligamentum pectinatum, iris, ciliary muscle, choroid, and retina with plasma cells, were relatively slight as compared with the scleral, and clearly secondary to the last-named.

No spirochætes, tubercle bacilli, or sporothrices could be found, although looked for in properly stained specimens.

The pathological process found in the foregoing case by **Verhoeff**, of Boston, is identical with that noted by the same observer in "brawny scleritis," differing only in degree. In the present case the new tissue was much more abundant when compared with Scholdtmann and Friedland's cases of "brawny scleritis," whereas the necrosis was insignificant. The massive formation of fibrous tissue in the present case suggests a fibroma, were that not ruled out of court by the associated marked chronic inflammatory reaction. Lastly, in the present case the scleral changes were, contrary to the rule, most pronounced in the posterior half of the eyeball. A similar case was that of Wagenmann (*Ber. d. Ophthal. Gesellsch.*, 1903, p. 140), described by him as one of "posterior scleritis," and recognised by him as associated with the same lesions as known to be characteristic of "Brawny scleritis." The case is also believed, as regards the histology of the lesions to be identical with that described by Parsons (*Trans. Ophth. Society U.K.*, Vol. XXI, p. 181, 1902) as "endothelioma of the optic nerve sheath."

It is suggested that the clinical picture of "Brawny scleritis," must be enlarged to cover a much wider range than that originally described by Schlodtmann. It will vary in accordance with the seat of disease (anterior or posterior), the severity of the process, and the degree in which the uvea takes part. SYDNEY STEPHENSON.

(4) The white areas found in albuminuric retinitis tend to assume more and more importance, since Nuel and Rochon-Duvigneaud have shown that the vascular changes, once believed to be the chief element of the disease, are altogether secondary and, indeed, often not present at all.

Mawas, of Paris, sets out to enquire into the structure and chemistry of the white retinal *plaques*.

The *technique* adopted by the author in his investigations was briefly as follows.—As soon as might be after death, a few drops of pure formol were injected into the vitreous body. The object of the injection was twofold: first, to prevent or retard anything like a rapid general autolysis of the retina; and, secondly, to preserve a certain tension within the eyeball. Fixation was obtained by 10 per cent. formol, 20 per cent. formol bichromate, Zenker's fluid, or Tellyesniczki's fluid. In most instances it was completed by immersion of the specimen for several days in 3 per cent potassium bichromate. The globes were embedded and cut in celloidin; and, as a rule, were stained with hæmatine, followed by rubin S and orange G. For the depigmentation of sections, a 2 per cent. solution of chromic acid was employed, as described in THE OPHTHALMOSCOPE, 1913, p. 492. The investigation of lipoids and fats was carried out by two plans, as follows.—1. Fixation in 10 per cent. formol, followed by immersion for forty-eight hours at least in a 3 per cent. solution of potassium bichromate, to which a few drops of acetic acid were added. Washing in running water for twenty-four hours, followed by dehydration in successive strengths of alcohol, embedding in celloidin, and staining with hæmalum, and Sudan III in saturated alcoholic solution. 2. Fixation in 10 per cent. formol or in 20 per cent. formol bichromate, after which the specimen was washed for twenty-four hours in running water. Immersion in a 2 per cent. solution of osmic acid for twenty-four hours. Specimen embedded and cut in celloidin.

When we examine a case of albuminuric retinitis with the microscope, we find two kinds of lesions in the affected part; hæmorrhages and exudations. The exudations are homogeneous or slightly fibrillated, and well stained by eosin and rubin S. They lie in the internuclear and in the outer nuclear layers of the retina. It is difficult to say in a given case if one has to deal with fibrin or with a complex albuminoid substance derived from the destruction of nervous matter.

The white retinal areas are formed by the aggregation of the so-called fibrinous exudations lying in the outer third of the retina. While there can be no doubt as to that point, Mawas enquires as to whether there may not be in albuminuric retinitis other lesions capable of causing the familiar ophthalmoscopic appearance. The question he answers in the affirmative. In the first place there are areas of gangliform degeneration of the nerve fibres, which may assume a certain grossness and give rise to the appearance in question. Secondly, Rochon-Duvigneaud has insisted upon the part taken by detachment of the internal limiting membrane, raised by an exudation of a nature still unknown. Both these lesions, however, are rare, and by no means characteristic of albuminuric retinitis. Thirdly, masses of vesicular and granular cells (phagocytes) crammed with lipoid granulations may be responsible for the ophthalmoscopic picture. There are, then, four very different anatomical lesions which may cause the white exudations visible with the ophthalmoscope.

A moment's reflection, indeed, will show that different lesions may in a transparent membrane such as the retina give rise to *plaques*, opaque and coloured in an identical way. Of the various lesions enumerated, by far the most important share in the ophthalmoscopic picture is taken by the fibrinous exudations and the granular cells, but there is this important difference between them, namely, that the former are present at an early stage of the disease, while the latter do not appear until long afterwards. At a late stage, the white *plaque* may contain nothing but the granular cells.

These granular cells, which have been known for long, have only recently had their true meaning explained. They are, as a matter of fact, macrophages, and analogous to the granular bodies found when the nervous centres are in a state of degeneration. It is as yet uncertain whether they originate from the lymphatics or from the neuroglia. They are large cells, of which the protoplasm is vacuolated after ordinary fixation and staining. The nucleus is often deformed, being crushed by the development of vacuoles. The vacuoles are empty when ordinary methods have been employed, but by special methods of treatment, such as those described earlier in this abstract, the contents of the vacuoles are represented by tiny drops of a fatty nature, or, more exactly, by small drops of lipoid. They represent cells in full evolution, in various states of secretion and activity. Accordingly, they vary in anatomical appearance.

It is certain that neither the gangliform degenerations nor the detachments of the limitans interna contain any trace of fat or lipoid or of cholesterin or of fatty acid. The same remark applies also to the exudations lying in the internuclear layer of the retina, which, as already said, are the commonest cause of the white ophthalmoscopic areas. In short, lipoid products are found only in the granular cells, and even there they are transitory.

Mawas's communication may be summed up by saying that, in his view, the white *plaques* found ophthalmoscopically in cases of albuminuric retinitis are due, individually or collectively, to four anatomical elements, which, named in the order of their importance and frequency, are as follows:—(1) so-called fibrinous exudations situated in the internuclear and outernuclear layers of the retina; (2) granular cells of the nature of macrophages; (3) gangliform degeneration of the layer of nerve fibres; and (4) detachment of the limitans interna of the retina by exudation, the exact nature of which is still unknown. Of these various elements, none contains fat (neutral or acid), lipoid, or cholesterin, except the granular cells, which include particles staining orange-yellow with Sudan III, grey with osmic acid, and ink-black with osmic acid after previous oxidation by formol or chromic acid or its salts. They are extremely soluble in alcohol, and the solvents of fats, such as ether, xylol, toluene, etc. They are, in fact, little drops of lipoid. The presence of the granular cells is essentially transitory, and to be regarded as a phase in the disintegration of the exudative masses. The exudations in the internuclear layer are pathologically characteristic of albuminuric retinitis.

The communication is accompanied by five plates containing eleven coloured figures. SYDNEY STEPHENSON.

IV.—CONGENITAL ALEXIA.

Schröck, Rudolf.—**Congenital word-blindness. (Ueber kongenitale Wortblindheit.)** *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

According to **Schröck**, of Rostock, the first, and very complete accounts of word-blindness given by such British authors as W. P. Morgan, J. Kerr, and James Hinshelwood, were overlooked on the Continent, and the first German writers on the subject seem to have been ignorant of the contributions referred to. Morgan had originally expressed the belief, confirmed by subsequent investigation, that the condition was the result of a developmental defect, and to Sydney Stephenson belongs the credit of having pointed out that it may show a familial incidence. The first case fully reported in the German literature was that given by Peters in 1908.

After reviewing the literature down to the present date, the author adds an account of five cases, three of which are in every respect typical.

Most cases of word-blindness, Schröck points out, come under the care of oculists, since their teachers or guardians, naturally enough, think that they are suffering from some ocular defect. It is an interesting fact that, even since the publication of Peters' case, very few cases have been reported in Germany, and a good many more in this country. Schröck attributes this to the difficulty of learning to read the English language, owing to its non-phonetic spelling, rendering the discovery of the defect more certain. He nevertheless believes that the number of cases is no greater in this country than in his own.

With regard to ætiology, Schröck believes that nothing has negatived the original suggestion of Morgan, that it is due to an aplasia of cerebral tissue in the region of the angular gyrus. Fisher saw three cases due to cerebral hæmorrhage during birth, but the diagnosis was purely clinical, and not based on pathological findings. Although Ringer may, on theoretical grounds, be correct in stating that congenital word-blindness is a minimal form of idiocy, the author holds that it would be very unwise to stigmatise these cases by the introduction of such a term. Several attempts have been made to find a more correct name than "word-blindness," but, whatever may be its drawbacks, this name has probably come to stay.

A comparison of all the published cases shows that they present a series of defects of varying intensity, from those in which apparently there is only a slight diminution of the nervous elements, the teachable class, to cases of absolute and irremediable defect. There is also an interesting group in which the defect is intermittent.

The paper closes with remarks on the pedagogic aspect of the subject. A bibliography is appended. A. J. BALLANTYNE.

V.—INJURIES OF THE EYE.

(1) **Kraupa-Runk, Martha.**—**Two rare injuries of the eyes by the prickly parts of plants. (Zwei seltene Verletzungen des Auges durch stachlige Pflanzenteile.)** *Centralbl. f. prak. Augenheilkunde*, November-December, 1914.

(2) **Tresling, J. H. A.—Cases of injury to the optic nerve Kasuistische Mitteilungen über Verletzungen des Sehnerven.)** *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

(3) **Williams, Edward R.—Nervous symptoms from contusions of the eye.** *Trans. Amer. Ophthal. Society*, Vol. XVI, Part i, 1915, p. 402.

(4) **Wood, Casey A.—Incised wound of the right cornea from a broken nose-glass.** *American Journal of Ophthalmology*, November, 1915.

(1) **Martha Kraupa-Runk,** of Teplitz, records a couple of cases of inflammation of the superficial structures of the eye, due in one instance to the spicules of *Arctium Lappa Compositæ*, and in the other to the barbed hooks of a beard of barley. SYDNEY STEPHENSON.

(2) The two cases reported by **Tresling**, of Groningen, closely resembled each other in their symptoms, but had a different ætiology.

Case I.—A labourer, 23 years of age, was seen shortly after receiving a wound in the neighbourhood of the left eye from a knife. There was an incised wound below the left eyebrow, another in the centre of the left lower lid, and a large opening in the eyeball with prolapse of uvea. The knife appeared to have taken a vertical direction from above downwards. The movements of the eye were not abolished, but its vision was *nil*. On the opposite side there was ptosis, loss of ocular movements, dilatation and rigidity of the pupil, ecchymosis of the lids and conjunctiva, and proptosis. There was anæsthesia of the right cornea and in the area of distribution of the supra-orbital nerve, and on examination, Tresling found blurring of the right disc and dilatation of the retinal vessels. Hæmorrhage occurred repeatedly from the right nostril. Congestion of the right optic nerve and vessels increased, and three weeks later, the disc was in a state of pallor. Six months later, there was still paralysis of the right third nerve and anæsthesia of the cornea, and atrophy of the optic nerve was definite. On the injured side there was atrophy of the eyeball and symblepharon, and, of course, the patient was totally blind. The striking feature of the case was the contra-lateral appearance of symptoms of nerve injury, believed to be due to intracranial hæmorrhage and fracture of the base involving the right sphenoidal fissure.

Case II.—A seaman, 28 years of age, was injured by a knife in the region of the left eye, eleven days before he was seen by the author. He became unconscious some time after the injury. The physician who saw him almost immediately after the injury observed bleeding from the nose and mouth, and found that the *right* eye was blind. Tresling found a deep granulating wound below the left eye and œdema of the surrounding parts. The left eye had normal mobility, vision was 5/5, and tension, fundus, and field of vision were normal. On the right side, however, there was ptosis, exophthalmos, immobility of the eye, dilatation and rigidity of the pupil, some loss of corneal sensibility, and hyperæmia of the disc and retinal veins. Two or three weeks later, the right disc was showing signs of atrophy. A fracture of the left malar bone could be made out, and a radiogram showed a large piece of a knife blade in the skull, pointing from the wound in the left cheek to the neighbourhood of the right optic foramen and sphenoidal fissure. It was removed with difficulty, and was found to measure 9 cm. by 2 cm.

A. J. BALLANTYNE.

(3) The main object of this communication by **E. B. Williams**, of Boston, Mass., is to call attention to the nervous symptoms of shock, which may on occasion follow even trivial contusions of the eyeball. It is based upon the observation of forty cases, mostly cared for at the Boston City Hospital.

The shock may take the form of a general shock, or may be a shock of the eyeball alone. The symptoms of surgical shock are usually fleeting, whereas the psychic shock of the globe has a more or less permanent effect upon the retina. As regards the former, upon being struck in the eye, the patient usually staggers and falls. He remains dazed, but does not usually lose consciousness. He feels faint or chilly, looks pale and haggard, is nauseated, and often vomits. Owing to the decrease of blood pressure, his pulse is weak and rapid. These symptoms usually disappear after the first night's sleep. The prostration, both mental and physical, however, will often last several days. Most important factors in the production of shock are (1) the nervous susceptibility of the patient, and (2) the expectation or not of the injury. As regards psychic shock of the eyeball, this was carefully studied by von Merz during the Russo-Japanese War in 1907 (*Klin. Monatsblätter fur Augenheilk.*, Beilageheft, 1905), where it was caused by air concussion following the bursting of shells. He divided the cases into two classes, namely, those due to (1) psychic shock, and (2) paralytic dilatation of the vessels between the retina and the choroid. Williams gives examples of both these conditions. The communication terminates with remarks upon traumatic delirium and traumatic neurosis. SYDNEY STEPHENSON.

(4) **Casey Wood**, of Chicago, adds another to the list of cases of damage to the eye by broken spectacles and eye-glasses, or, as Wood prefers to call them, "nose-glasses." In this instance the patient was a female, an unusual occurrence since nearly all recorded cases have been in men. The actual accident was a somewhat peculiar one. The patient, while rising from a chair, placed her foot upon the rocker of a rocking chair near by. The chair tilted up and the far end of it struck her on the right side of the face, breaking the lens and sending a portion of it into the eye. There was a prolapse of iris into the corneal wound. This was trimmed off carefully, and the eye dressed with atropine ointment. Some rise of tension took place, but the atropine was persevered with, and eventually the case did well, no glass apparently having remained in the eye and no internal damage having been suffered. The rise of tension was quite transient. ERNEST THOMSON.

VI.—MYIASIS OF THE EYE.

Betti, Luigi.—**Ophthalmomyiasis.** (**Ueber die Ophthalmomyiasis.**) *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

Betti, of Siena, has seen four instances of insect larvæ in the human conjunctiva in two years.

In the first case a woman complained of pain due to an insect flying into the right eye. This had happened a few hours earlier, and, although she was sure that the insect had only struck the eye momentarily, the pain had increased and there was a feeling as of a sharp foreign body moving between the eye and eyelid. Next day the pain was still more severe. The lids were found to be red and swollen, and there was hyperæmia of the conjunctiva and mucopurulent secretion. The conjunctiva was dotted over with small vesicles. The cornea and iris were normal. A white larval organism was detected in the fold of the conjunctiva, wriggling about on the surface. Others were discovered, and several were removed. Lotion and a mercurial ointment were prescribed. During the next day or two the patient developed pain in the nose and throat, accompanied by catarrhal secretion containing similar larvæ. The condition extended to the antrum of Highmore and to the middle ear.

The other three cases were somewhat similar, except that they did not suffer from extension to the nose and other parts

In all four cases the organism was the larva of the *Œstrus ovis*, the fly which lays its eggs in the nares of the sheep.

Myiasis in man is rare in central Europe, but relatively frequent in Russia. The two European species are the *Estridi* and the *Muscidi*, and of the former the most important are the *Œstrus ovis* and the *Œstrus bovis*. The affection due to *Œstris ovis* in man's eye may be said to be an innocent form of myiasis, in spite of the severe complications of Betti's first case, for it does not attack healthy tissues, in contrast with the *Muscidi* which cause actual destruction of tissues, attacking the cornea, iris, lens, etc., and may even lead to the death of the host. This is especially true of *Lucilia macellaria*, which is found in tropical countries. In cases like those seen by Betti, the treatment consists in removing the individual larvæ by means of a pipette or forceps, and applying a mercurial ointment after douching the conjunctiva. If the larvæ should be found in the anterior chamber or under the conjunctiva, surgical methods must be employed. A. J. BALLANTYNE.

VII.—SCLERECTOMY AND LATE INFECTION.

(1) Gifford, H.—A case of late infection after Elliot's trephining. *Ophthalmic Record*, January, 1914.

(2) Axenfeld, Th.—A remark regarding late infection after trephining. (Eine Bemerkung zur Spätinfektion nach der Trepanation.) *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

(3) Butler, T. Harrison.—The present position of sclerotomy, with a special reference to the danger from late infection *Archives of Ophthalmology*, November, 1915.

(1) **Gifford,** of Omaha, records a case of purulent infection of the eyeball, which took place after or before an attack of catarrhal conjunctivitis two weeks after trephining with an iridectomy. The purulent exudate could be traced from the trephine hole past the coloboma behind the iris and out through the pupil into the anterior chamber. The conjunctivitis yielded promptly to zinc, and the purulent inflammation improved on paracentesis, mercury, and salicylates, but the prospect for useful vision did not seem promising. The operation and primary healing were uneventful, and the patient went home in a week, when the only thing unusual about the appearance of the eye was an exceptionally thin bleb. Tension was normal.

Gifford reviews the thirteen cases of late infection after trephining which have previously been reported, and from these experiences, states "that it is perfectly clear that the fistulizing operations, that is the Lagrange, the Elliot, and all their various modifications which depend for their efficacy on the production of a subconjunctival fistula, carry with them the danger of late infection."

It is also apparent that the thinner the bleb the greater the danger of late infection, and yet some writers insist that to get a good fistula we must have a thin flap. The results of Lagrange and Kuhnt, however, indicate that a sufficiently thick flap to insure against infection is not inconsistent with good pressure regulation. "As a matter of prudence, however, we might in the future warn patients with conjunctival blebs to pay special attention to the hygiene of the conjunctival sac and to the condition of the lacrymal passages. Patients living far from any oculist should keep a zinc collyrium or something of the sort on hand to combat the first symptoms of catarrhal conjunctivitis; and the importance of reporting to the oculist at regular intervals for inspection of the bleb with the aid of fluorescein should be urged."

In view of this danger, it is questionable whether the use of fistulising operations is justifiable in all forms of glaucoma, especially in acute glaucoma, where a simple iridectomy usually gives such good results; and if the event proves that late infections are at all common, even with the most approved methods of forming the flap, it may be doubtful whether they should be resorted to until an iridectomy has been tried.

Elschnig indeed predicts that in a few years fistulising operations will have been given up in favour of iridectomy or cyclodialysis. J. JAMESON EVANS.

(2) **Axenfeld**, of Freiburg i. B., again draws attention to the danger of late infection, which he believes to be even more frequent than the number of published cases would indicate. He refers to four cases occurring in his private work, one of which had purulent infection of both eyes, operated on at the same time.

While upholding the operation of trephining in suitable cases, he says it should not be done, generally speaking, where there is reason to believe that some other operation will suffice. In view of the risks to which a trephined eye is exposed, it is especially important to observe this rule in the treatment of young subjects. In hydrophthalmos, anterior sclerotomy, repeated if necessary, has proved its value and should be preferred to trephining.

A. J. BALLANTYNE.

(3) **Butler**, of Birmingham, has returned once again* to his attack on the modern operations for glaucoma, of one of the forms of which he was, until recently, an ardent advocate. The reviewer looks forward to a time, not he believes very far distant, when Butler's services will once again be enlisted in support of a faith, which for the moment he is attempting to destroy.

His first important contention would appear to be, that inasmuch as most sclerectomists make an iridectomy an integral part of their procedure, they might as well perform a simple iridectomy and have done with it. This we hold is an unsound view. It implies two things:—(1) that an iridectomy, undertaken in the course of one of the modern glaucoma operations, is as difficult and as dangerous a procedure as it is when performed according to the classical method; and (2) that it is the removal of a portion of iris which is the essential factor in ensuring the success of the operation. To deal with these in turn.—Few surgeons, who have had an earlier experience of simple iridectomy, and a later one of the removal of a button of iris through the small aperture made by a trephine or by a punch, would venture to compare the two so far as either risks or difficulties are concerned. An iridectomy through a trephine hole is, comparatively speaking, a safe and easy procedure. The same remark applies to the manœuvre when undertaken through one of the other limited wounds inflicted by a modern sclerostomy.

At the International Congress in London, in 1913, Butler challenged the reviewer's opinion that the very opposite is true of iridectomy. That opinion had not been lightly formed. In was at first the outcome of an experience that can be fairly claimed to be quite unrivalled outside of

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**vide* also THE OPHTHALMOSCOPE, August, 1914, and August, 1915. These three papers must be taken together.

India. In no other country does a surgeon get the opportunity of teaching a large number of other surgeons to operate on the living eye. A speaker at the British Medical Association's meeting in Brighton took up the same attitude as that of Butler, on the strength of his teaching of the operative surgery of the eye on the dead body! No deduction of the least value can be made from such evidence. What is a simple procedure in the dead-house, and still more *what seems such*, when robbed of the after-course of the case, and of the retribution then exacted for the slightest lens injury, becomes to the inexperienced surgeon a veritable nightmare when applied to the shallow chamber of a nervous patient. The erratic movements of a timid subject, combined with his defensive acts (such as squeezing the lids, looking upwards, etc.), invest the procedure with a degree of difficulty sufficient to fill strong, self-reliant men with the deepest anxiety. The writer has material from which he could illustrate his point, but which cannot be published for very obvious reasons. Suffice it to say, that the opinion he holds so strongly has been formed after watching men who were good surgeons learning to perform an iridectomy neatly. The man who can make a finished exhibition of the classical procedure for iridectomy on a glaucomatous eye has little to learn in ophthalmic operating. Since the International Congress mentioned, the reviewer has gone out of his way to find out from surgeons of large experience if their views on this subject coincide with his own, and he has always found that they do. They, one and all, place iridectomy for glaucoma high on the list of difficult and anxious operations. This has fortified him in the opinion, originally formed after careful observation, that the classical iridectomy of von Graefe, performed on a glaucomatous eye, is one of the most hazardous and anxious procedures in ophthalmic surgery. This does not mean that he implies that the newer operations are destitute of difficulty or of danger. Very far from it. The question is one of relative and not of absolute difficulty and risk. He regrets that he must differ very widely indeed from Butler on this subject.

With regard to the second point, it has been proved up to the hilt that, provided iris impaction can be avoided (and this we contend is here the true and only *rôle* of an iridectomy), a modern filtration operation is just as successful whether an iridectomy is performed or omitted.

The next point of interest is Butler's discovery that in the cases he reviews the results of iridectomy are at least equal to those of the modern operations for glaucoma. The evidence he puts forward is open to criticism from both extrinsic and intrinsic sources. To take the extrinsic first. There are few facts which stand out more clearly than that the great body of ophthalmic surgeons both were, and still are, convinced that,.whatever may be its merits in the treatment of acute glaucoma, iridectomy has proved a failure for the relief of the chronic disease. The subject is far too large to be pursued here. It is one which deserves an article to itself. Intrinsically, Butler's evidence is far from convincing, for, while it purports to show that iridectomy is inferior to the modern operations in improving or preserving vision in acute or sub-acute cases, it ventures to put it markedly ahead of them for the treatment of chronic glaucoma. A contention so at variance with the world-wide beliefs of ophthalmic surgeons would appear to argue something very unusual either in the methods of obtaining statistics or in the surgical *technique* employed.

Butler rules out Indian experience on the ground that so many cases are lost sight of, but he forgets that so far back as the end of 1913, the reviewer was able to refer to over 200 cases, which had been kept under observation for periods varying from a few months up to four years. The statistics of the Jerusalem Hospital (where he was formerly employed) may be as untrustworthy as Butler would have us believe, but it is not safe to use them as a standard for judging a well-endowed and well-equipped Indian Hospital, with the machinery of a powerful Government behind it, to enable its cases to be followed up, if required. Few operators in any part of the world can even to-day point to over 200 cases of any one form of filtration operation carefully followed. Very few, indeed, can touch that total when they "let everything go in." Butler himself, according to the figures given in this paper, has done 40 such operations all told, whilst the total number he has under review is 103 only. His dismissal of the Indian figures seems, therefore, to the reviewer to be unduly and unjustifiably summary.

This communication does not stand alone. It is the latest of a series of utterances on the same topic. Details wanting in one are supplied in another,* and it is therefore necessary to take all of them together, in order to judge of the subject as a connected whole.

The questions raised are of such interest as to justify a closer examination of Butler's cases. We take the acute ones first :—

Case 1.—This is admittedly one in which a form of cyclitis has played a *rôle* in the past, and it is stated that after the operation "keratitis punctata was always present," and, again, that "the eye was injected for nearly a month" after operation. This alone should have made its inclusion in a list of "late infections" very doubtful, but the clinching fact is yet to follow, for we learn that "the trephine hole healed up solidly." The critics of the modern methods cannot "have it both ways." They assume, and almost certainly they are correct in assuming, that it is the opening into the interior of the eye, shut off from the surface only by a thin layer of conjunctival membrane, which constitutes the danger of these operations. If the aperture in the sclero-corneal tunic had healed up, then the channel for true "late infection" had ceased to exist, and this case could not fairly be included in that class.

Case 2.—The history here is a vague one, and although it may have been one of "late infection," the infection of the second eye at least suggests the possibility of both eyes having a common autogenetic source of intoxication in "an alcoholic female of 55." The recovery of the second eye under treatment is quite as easily explained on this hypothesis as on that adopted by Butler. There is no indication in the notice that such a possibility had been thought of, or that any search for such a source of infection had been undertaken. It is not suggested that the case may not have been one of late infection in a predisposed subject, but it certainly would have created a better impression of impartial judgment had both sides of the shield been presented, in dealing with so important a subject.

Case 3.—There are two significant points in connection with this eye, *viz.*, (1) that the flap was button-holed and sewn up, and (2) that "the eye was already a useless one." The latter takes away from the force which this case helps by weight of numbers to lend to what Butler has gone so far as to speak of as "the tragedy of sclerostomy." As to the former point, it is true that many of us have had cases in which, in spite of a button-holing of the flap, a perfectly successful result has been obtained. On the other hand, the reviewer has on previous occasions pointed out the risks that may be run by suturing the flap at all, even at its periphery; it is to be remembered that in a case like this one, where the stitch was introduced right over the sclerostomy aperture, such a risk must have been very appreciably enhanced.

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*THE OPHTHALMOSCOPE, August, 1914, and August, 1915.

Butler himself admits the possibility that the accident may have influenced the result. The reviewer has never attempted to suture up a conjunctival button-hole in a trephine operation; he has left the small holes severely alone, and seen them cicatrise up satisfactorily. His experience of larger rents, either in his own practice, or in that of learners in Madras, has been very small, and has invariably been met by altering the site of the trephining, and preparing a fresh flap, or by an extension of the same flap to one or other side. In view of the fact that the very aim of the operation is to establish a permanent communication between the interior of the eye and the subconjunctival space, he would shrink from inserting a suture right over the trephine hole; such a procedure seems to him to involve the taking of an unnecessary risk. It is not asserted that the late infection in this case can be confidently, or even very probably, attributed to the conjunctival tear; but the possibility that this had an influence must not be lost sight of, when sifting the evidence marshalled to secure the condemnation of so important a group of measures as those which aim at the production of a filtration scar.

Case 4.—Elsewhere described as "sub-acute." A punch operation was done on April 16th. On August 6th, "the patient, an elderly alcoholic woman, was stung by a wasp, which caused much swelling of the lids, and redness of the eye in question." Seen on September 17th, "there was a yellowish-white area over the punch hole and an acute iritis. The inflammation quieted down and the aperture cicatrized firmly." To the reviewer's mind, this case cannot fairly be put down as a late infection. The wasp sting would quite easily account for the mishap. Moreover, once again we note that "the eye was a blind one and no harm was done" (*Vide* report of the same case in THE OPHTHALMOSCOPE, August, 1915). The reviewer once again draws attention to the bearing of such a fact upon what Butler has called the "tragedy of sclerostomy."

Now for the four slight cases.—In two of these, it is noted that "large ectatic scars" were present. The reviewer has pointed out that such scars are the product of a faulty *technique* (THE OPHTHALMOSCOPE, October, 1914), and that they should, and usually can, be avoided. The evidence available appears to point to their being the principal cause of late infections. In one case the eye was the fellow of case No. 2, already dealt with, and, as has been said above, it is suggestive of the possibility of autogenetic infection. In the fourth case, the chamber had remained shallow for fourteen days, and Butler states that the orifice was covered only by a very thin flap. It is possible that he made as thick a flap as was available; but, as has been pointed out in the communication already referred to (THE OPHTHALMOSCOPE, August, 1915), there is reason to believe that thin flaps are not infrequently a dangerous product of an easily avoidable fault in *technique*.

It is not unworthy of note that, so far as can be judged from Butler's reports, not one of these "tragedies," as he calls them, in chronic cases appears to have left the patient any worse off than it found him, whilst in the four acute cases, the eye was blind in one before the operation, and was reported as useless in a second; vision was lost in two, one of which reads more like a case of recurrent cyclitis than of late infection; in the other there is at least a suspicion of autogenetic intoxication. To use the term "tragedy" or "tragedies" in connection with this series of cases, in the way Butler has done, appears to the reviewer to be evidence that an exaggerated view has been taken. Furthermore, he thinks that it is a regrettable misuse of forcible terms.

Butler says "sclerostomies are more liable to slight iritis than simple iridectomy, a fact emphasized by Elliot." It is difficult to understand how anyone, who has read the reviewer's "Sclero-Corneal Trephining," can make such a statement (*Vide* pages 181 and 182, Second Edition, 1914). It is in direct contradiction of what has there been clearly written.

Again, he says of late infection, " Elliot devotes only a few sentences to it in his book, but during the last three years cases have been reported in increasing frequence." A reference to the work in question (which, by the way, was reviewed in THE OPHTHALMOSCOPE before Butler read the first of his papers under reference) shows two pages (pages 117 and 118) of over 770 words devoted to this subject, which has also been very fully discussed by the reviewer in other papers, as well as in the " Ophthalmic Year Book " for 1913 and 1914. He considers Butler's comment on the matter misleading, although he knows well that it was not meant to be so.

Butler refers to a discussion, which he describes as having taken place " at Oxford last July." It is desirable to make it clear that he means July, 1914, for the burden of the discussion on late infection last July was very different from being what is described in this paper. Of the previous meeting the reviewer has no first-hand knowledge.

Butler defends himself from the suggestion that punch operations might be more likely to suffer from late infection than the other modern procedures. No competent critic is likely to advance such a view. He reminds us of one fact which is too often lost sight of, *viz.*, that not merely the modern filtration operations, but also iridectomy, cataract extraction, and even sclerotomy, may be, and sometimes are, followed by late infections.

A curious feature in the experience of surgeons who have performed the newer operations has been the large percentage of late infections in the practice of certain of them. Few probably have been more unfortunate than Butler himself, who owns to·20 per cent. of late infections in his sclerotomies. Vossius runs him close with two total losses of the eye from late infection out of twenty cases trephined. On the other hand, a number of European and American surgeons, with comparatively large experience, have not had a single case of late infection. Clearly, the factor of the individual operator has at least something to do with these discrepancies. By the way, Butler uses the term "sclerotomy" where most surgeons would use "sclerectomy" or "sclerostomy". We understand, however, that this was due to a printer's error, and that it does not represent his real views on the subject.

Butler is well-known as an able surgeon and as a forcible writer. Had this communication come from one of a less reputation, or had it been the first of the same tenor, it might have been passed over with a very scanty review; but as things stand, it appears to call for plain and outspoken criticism. The reviewer has offered this with the more regret, because, in addition to his very sincere admiration for Butler's work, for his abilities, for his kindliness, and for his honesty, he values his friendship very highly.

He has no wish to belittle the importance of late infection, but there is another side to the shield. In treating glaucoma, we are not dallying with cosmetic precedures, we are fighting desperately, with our backs to the wall, to save our patients from the horrors of life-long blindness. In doing so, we must take some risks, but the reviewer believes that with the proper *technique*, we can reduce those risks to within very modest limits. The modern operations have been before the profession for a number of years, and opinion is gradually forming and hardening. Finally, it will be settled, not by the opinion of individual writers, but by the practice of the great, and too often mute, mass of ophthalmic surgeons, the results of whose daily experience in the end largely decide the great questions of medicine. "*Magna est veritas, et prævalebit.*" R. H. ELLIOT.

VIII.—OSTEOMA OF THE ORBIT.

(1) **Blake, E. M.**—A huge orbital osteoma. *Ophthalmic Record*, August, 1913.

(2) **Wray, Charles.**—Bony growth in frontal sinus. *Proc. Royal Society Medicine: Section of Ophthalmology*, July, 1915.

(3) **Wray, C.**—The diagnosis and treatment of osteoma of the orbit. *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 190.

(4) **Wray, C.**—Osteoma of the orbit? *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 200.

(1) **Blake,** of Yale, describes the case of a patient, a man, 82 years of age, who ascribed the development of an extensive osteoma to the entrance of a particle of sawdust into the left eye about sixty years previously! X-ray photographs showed the tumour to be an osteoma of the frontal bone extending back into the apex of the orbit and apparently invading the frontal sinus. Thick offensive pus was discharged from incisions made into the growth with the object of relieving pain. Further operative treatment was not deemed advisable. J. Jameson Evans.

(3) This suggestive paper by **Wray**, of London, deals with the diagnosis and treatment of osteoma of the orbit. Those interested in the subject are recommended to read the original communication.

Most of the bony growths met with in ophthalmic work are orbital, or, to be more exact, originate from the sinuses, although a few arise from the periosteum of the margin of the orbit. Their diagnosis may be simple or exactly the reverse. The orbit (the depth of which is about 50 mm.) may be explored with the finger, the probe, or the spatula, but before any of these special examinations are made, morphine should be given and deep injections of novocaine be made. In order to be used with safety, the end of a probe should be blunt, and the probe should be bent to the shape of a squint hook. The spatula should be of flexible metal, 10 mm. wide, with the extremities 2 mm. thick. From figures obtained from the *cadaver*, Wray finds that the spatula when pressed into the skin can be passed to a depth of 15 mm. above, of 12 mm. below, of 15 mm. on the inner side, and of 11 mm. on the outer side of the orbit. If the spatula be passed *per* the conjunctival fornices, the measurements are :—above, 33 mm. ; below, 16 mm. ; inner side, 21 mm. ; and outer side, 22 mm.

The Röntgen rays should be employed in the diagnosis, particularly in the osteomatous growths, and in every case sagittal and profile negatives should be obtained. The "posing" of the patient in accordance with the position of the growth, as suggested by the direction of the exophthalmos, which is done for the purpose of avoiding shadows, is of considerable importance, although Wray is constrained to admit that a careful examination of the results obtained with the X-rays is, upon the whole, somewhat disappointing. It is still necessary therefore to depend mainly upon old established lines of clinical examination.

Wray is of opinion that operation should be undertaken even when dealing with slowly growing osteomata, and justifies his position by the mortality figures of Birch-Hirschfeld, quoted below :

MORTALITY IN CASES OF OSTEOMA OF THE SINUSES.

	Unoperated.	Operated.
Frontal	48·2 per cent.	13·6 per cent.
Ethmoid	80·0 „	12·7 „
Sphenoid	100·0 „	33·0 „

The mortality would doubtless be still lower than that given by Birch-Hirschfeld if operation were undertaken whilst the growths were small and the sinuses but slightly distended.

The difficulties of removal depend upon the size and hardness of the growth and the nature and extent of its attachment. One rule apples to all operations for osteomata of the orbit, namely, that any existing membrane and the periosteum should be most carefully preserved unbuttonholed, so as to shut off the field of operation from the tissues of the orbit. By means of a drill or gouge, it is then ascertained whether one has to deal with a cancellous or an ivory growth. In the case of the cancellous growth, slight leverage is employed, in the hope that it may be attached by means of a narrow pedicle. In the contrary event, the growth must be removed by means of a small saw, or cut away piecemeal by the aid of bone forceps, until its site of origin is exposed or its involvement of a sinus made clear. It may be possible to remove the sinus portion through the aperture in the orbital wall, but if this be not so, part of the orbital wall must be taken away, after which the removal of the growth will probably offer no particular difficulty. In dealing with the ivory osteoma the principles of surgical treatment are essentially the same. After removal of the growth, blood-clot should be removed, the edges of the periosteum be sutured, leaving a small aperture for a drainage tube. Finally, the edges of the skin incision should be brought together, and the parts dressed in the usual way. After-treatment is simplified by the fact that sepsis rarely complicates osteoma of the sinuses. The dura mater may be exposed, but if *technique* be correct, the danger does not appear to be at all great.

SYDNEY STEPHENSON.

(4) Despite its title, this case, by **Wray**, of London, seems to be one rather of growth of the lacrymal gland than of the orbital sinuses or wall.

SYDNEY STEPHENSON.

IX.—GLAUCOMA.

(1) **Heerfordt, C. F.—Upon the glaucomatous dilatation of the anterior perforating ciliary vessels. (Ueber die glaukomatöse Erweiterung der perforierenden vorderen Ciliargefässe.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1913, p. 322.

(2) **Lawford, J. B.—Note on hereditary primary glaucoma.** *Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part i, 1913.

(3) **Bell, Percy G.—Notes on glaucoma.** *Canadian Medical Association Journal*, January, 1915.

(4) **Haag, Carl.—Glaucoma in the young. (Das Glaukom der Jugendlichen.)** *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

(5) **Mayou, M. S.—Glaucoma in a boy, aged 17 years.** *Royal Society of Medicine: Section of Ophthalmology*, April, 1915, p. 92.

(6) **Risley, Samuel D.—The significance of increased tension of the eyeball.** *Ophthalmology*, April, 1915.

(1) **Heerfordt**, of Copenhagen, believes that the dilated anterior ciliary perforating vessels which are occasionally found in eyes long affected with glaucoma, are not, as has been taught, veins, but arteries. He notes that they are trunks with comparatively few branches, showing no trace of that plexiform anastomosis which is so characteristic upon the scleral surface when these veins are dilated. The vessels, too, are tortuous, like the ciliary arteries, whereas the normal veins are straight. Many of them are accompanied by fine vessels, a condition typical of the anterior ciliary arteries. Finally, he asks, if these vessels are veins, where are the ciliary arteries? The final proofs, however, were afforded by an eye in which, in addition to the enlarged arteries, there were also some dilated veins. The reaction of these two classes of vessels to compression and to irritation by rubbing, and to the action of holocaine, clearly showed that some were veins, others arteries. T. HARRISON BUTLER.

(2) This is an addition to notes of some cases reported in Vol. XVII, Part i, of the *Reports*.

(4) Löhlein (in Graefe's *Archiv*, Vol. LXXXV) laid it down that the term "juvenile glaucoma" embraced (1) cases of early senile glaucoma indistinguishable from the ordinary senile cases, and (2) a much larger number of cases which, like congenital hydrophthalmos, are the result of congenital developmental defects, not of acquired disease.

Haag, of Tübingen, proceeds on somewhat different lines. He feels that previous statistical analyses are faulty, since they take account only of the relatively few cases reported as curiosities. His paper is based on an analysis of the material supplied by the eye clinic of Tübingen. His first tables give the actual numbers of glaucoma cases for the different age periods (in decades), the percentage relation of these to the whole, and their proportion to the number of persons living at the said ages. One result is that it is shown that the chance of glaucoma attacking an individual after the age of thirty-five is forty times as great as before thirty-five.

For the purposes of this enquiry, Haag takes all cases of glaucoma occurring up to the age of thirty-five as cases of juvenile glaucoma. A table of eighteen pages gives the main facts concerning sixty-seven such cases, including age, sex, eye affected, presence or absence of cupping, depth of anterior chamber, refraction, presence of congenital anomalies, and hereditary influences. The following are some of the conclusions reached as the result of an analysis of this table: Juvenile glaucoma is almost equal in its incidence in the two sexes, and in unilateral cases, there is no preponderance of one eye. In both sexes, the frequency of the cases increases with the age up to thirty-five. Other pathological conditions, especially general nutritional disturbances, are relatively frequent in these juvenile cases. Inflammatory glaucoma is almost twice as frequent as glaucoma simplex. Myopic refraction is relatively frequent, and this fact comes out more strongly in the case of glaucoma simplex than in the inflammatory cases. There is no evidence of a greater liability to glaucoma on the part of hypermetropic eyes. A deep anterior chamber is more frequent in glaucoma simplex, and a shallow chamber in glaucoma inflammatorium, and the cases with deep anterior chamber were practically all myopic eyes. The author found no preponderance of hereditary influences among these cases, as compared with cases of glaucoma in older patients, but other congenital anomalies were often observed. On the whole, the material did not point to any striking difference between glaucoma in the young, and glaucoma in persons of maturer years. A. J. BALLANTYNE.

(5) In a lad of 17 years, affected with chronic glaucoma of both eyes, **Mayou**, of London, trephined. There was severe hæmorrhage from the right iris at the time of operation, and subsequently there have been repeated small hæmorrhages in both eyes into the anterior chamber. No history of hæmophilia. SYDNEY STEPHENSON.

(6) **Risley**, of Philadelphia, utters a useful warning against the tendency to regard high ocular tension as a disease to be treated necessarily by some decompressive operation. He attributes much importance to uveal disease in the causation of glaucoma, and thinks that greater care in the investigation of the uveal affections which lead to elevated tension would enable us to adopt rational treatment with success at an early stage.

A. J. BALLANTYNE.

X.—ACCOMMODATION.

(1) **Uhthoff, W.—A contribution to the accommodation question.** (**Ein Beitrag zur Akkomodationsfrage.**) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912, p. 331.

(2) **McCool, Joseph L. — Anomalies of accommodation and their practical significance.** *Ophthalmology*, January, 1915.

(3) **Duane, Alexander,—Anomalies of the accommodation clinically considered.** *Trans. Amer. Ophth. Society*, Vol. XIV, Part i, 1915, p. 386.

(1) **Uhthoff**, of Breslau, examined carefully a case of bilateral total aniridia and was able to observe the movements of the lens in accommodation. He noted that the ciliary processes swelled and advanced, and that the diameter of the lens diminished during accommodation. Some irregularities appeared in the margin of the lens, and he saw a bright circular zone appear parallel to the circumference which had a shadowy margin towards the centre of the lens. He observed both the voluntary acts of accommodation and the influence of eserine. Two coloured figures help to explain the phenomena observed. T. HARRISON BUTLER.

(2) **McCool,** of Portland, deals with cases of spasm of accommodation and of subnormal accommodation, and also discusses the part played by attempts at the adjustment of the accommodation as a cause of asthenopia in astigmatism. He insists on the necessity for complete cycloplegia in the estimation of ametropia. A. J. BALLANTYNE.

(3) **Duane,** of New York City, considers the comparative neglect of anomalies of accommodation in clinical work as due to the fact that hitherto the data on which a satisfactory study should be based have been lacking. In the present communication, which is based upon a study of 170 cases, he makes a preliminary attempt to remedy this defect.

Duane begins by pointing to the work he has already accomplished in establishing the maximum, the minimum, and the normal accommodation at each age from 8 to 60 years, and shows the values obtained in tabular form. These values, it should be explained, are based upon 15,000 examinations.

He next describes the exact method employed in making the investigations.*

The varieties of disordered accommodation are enumerated as follows:—1. Insufficiency of accommodation. 2. Ill-sustained accommodation. 3. Inertia of accommodation. 4. Inequality of accommodation. 5. Excessive accommodation.

1 & 2.—*Insufficiency of and ill-sustained accommodation.*—The author supposes that these conditions occur in at least 5 per cent. of our patients. On the basis of 122 cases, it is suggested that accommodation insufficiency is not very common before 15 or after 45 years of age, and, broadly speaking, that there is no great difference between the sexes. It may be due to (*a*) accelerated sclerosis of the lens, or (*b*) weakness of the ciliary muscle. Duane believes that it is possible to distinguish the two forms from one another. In the first-named, which may be regarded as premature presbyopia, the curve of descent parallels the normal curve, but lies at a lower level. On the other hand, in the last-named the insufficiency is variable, so that the curve of descent exhibits irregular sinuosities and salients. Mixed types probably exist. About 12 per cent. of the cases are associated with convergence excess, 44 per cent. with convergence insufficiency, and 10 per cent. with other motor anomalies; in about 34 per cent. the external muscles are normal.

The causes of premature sclerosis are not known. On the other hand, Duane gives quite a long list of factors in the ciliary weakness type of insufficiency, including nasal obstruction (a frequent cause), toxic conditions, disorders of the internal secretions, neurasthenia and anæmia, vascular hypertension, and eye-strain (not common).

The intensity of the symptoms varies greatly, but in the main they consist of tired and aching eyes with irritation or burning or with headache. There is often blurred vision, especially for near work. Photophobia is quite a marked symptom in a number of the cases. Concentric contraction of the visual fields may be occasionally found.

As regards treatment, for the blurred near vision the distance glass should be supplemented by a proper addition for reading, and even when the vision is not much blurred, such a presbyopic addition may be necessary. The function of accommodation may be directly stimulated by reading exercises. For this purpose Duane recommends the fine test object employed by him in estimating the accommodation. The object is approximated to the eye until the black line blurrs, and this is repeated several times in succession, trying on each occasion to bring the line closer to the eyes. The exercise is repeated twice or thrice a day. Accommodation can also be stimulated, especially when the defect is associated with convergence insufficiency, by exercises with prisms, bases out. The local use of pilocarpin is not recommended by Duane. Supplementary measures are directed to the removal of any toxic condition, the cure of anæmia, the removal of nasal obstructions, the regulation of vascular anomalies, and the treatment of abnormal glandular conditions. In a word, everything must be done to remove any likely cause. Any associated congestion of the conjunctiva should receive careful attention.

3.—*Inertia of accommodation.*—Accommodative inertia is a condition analogous to the slow adaptation shown by some eyes in passing from light to darkness or contrariwise. If due to imperfect action of the ciliary muscle, it must be relieved by accommodative and particularly by convergence exercises.

4.—*Inequality of accommodation.*—When due to relative weakness of one ciliary muscle, unequal accommodation occurs quite frequently in ophthalmoplegia interna due to syphilis, tabes, injury, or poisons. Under such conditions the inequality in accommodation is usually associated with inequality of the pupils. Apart from inequality of the pupils, unequal accommodation may be caused by unequal action of the ciliary muscle, as in a case mentioned by Duane, where the symptoms were great asthenopia and marked spasmodic convergence when the patient, a man, aged 31 years, tried to use his eyes for near work. Most of the other cases of unequal accommodation appear to be due to unequal rigidity of the lenses in the two eyes. This condition of unequal presbyopia (or non-pathological inequality of accommodation) is found chiefly in patients between the ages of thirty-five and fifty years.

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* Anomalies of the Accommodation. By Alexander Duane. THE OPHTHALMOSCOPE, September, 1912.

5.—*Excessive accommodation.*—Like insufficience of accommodation, excess of accommodation may be either ciliary or lental in origin. A typical instance of the former is furnished by the accommodative spasm induced by myotics, particularly eserin. The other condition may be spoken of as "delayed presbyopia." SYDNEY STEPHENSON.

XI.—EYESTRAIN.

(1) **Gould, George M.—Systemic disease caused by eyestrain.** *American Medicine*, September, 1915.

(2) **Ross, T. A.—The ocular troubles of neurasthenia.** *Medical Press and Circular*, September 29th, 1915.

(3) **Kahn, W. W.—Migraine: its cause and cure.** *American Medicine*, December, 1915.

(1) **Gould,** of Atlantic City, has a long communication in which he epitomises his well-known views as to the pernicious effects of eyestrain. Numerous instances of relief, some of a very striking character, are quoted in support of his theories. It cannot be doubted that Gould's literary powers, together with intense enthusiasm, have done much to popularise his views, not only in America but in this country as well. At the same time, his very facility and happiness of expression, it is to be feared, sometimes lead him to pen things that were best unsaid, even although they may perchance possess a modicum of truth. Such, for example, is the closing sentence of the present communication:—"Scarcely one correct or therapeutic pair of glasses is to be found in any part of the world except in the United States; from Canada a dozen or two patients have come across the border to get such."

Gould's present position with regard to epilepsy and eyestrain, appears to be that the former is caused by the latter. The manifestations of epilepsy, however, can be cured only provided the precisely correcting glasses can be obtained early enough in life. He claims to have cured several epileptics even in early adult life, but he holds out little hope in such cases. Gould believes that senile cataract is caused by eyestrain, and that its development may be prevented by the provision of scientific spectacles. As he says, "I have never known a patient to develop cataract while under my care." The three cases quoted in support of his theory, however, fail to carry conviction to an unbiased mind, especially in view of the fact that in old folk lental opacities are often non-progressive, and that under such circumstances the visual acuity has been known to improve.

Finally, Gould records his conviction " that one-third of our suicides have eyestrain as their primary or sole cause." SYDNEY STEPHENSON.

(2) **Ross,** of Ventnor, finds that *muscæ volitantes* and asthenopia are ocular troubles common in neurasthenia. After a dose of calomel, no more is heard of the *muscæ* for a time, but if the patient is undergoing a rest cure, other means must be adopted, such as a candid explanation that they are just "specks" in the eye, that everybody has them, and that they will presently vanish. With attention to other things, the "specks" disappear from consciousness. The asthenopia is a much more serious symptom, and yet is easily cured if the matter be gone about in the proper way. The important point is not just what glasses may be prescribed, but how the surgeon examines and what he says. The enthusiastic man, who employs a cycloplegic and an astigmometer, and corrects to 0.12 D., particularly if he takes a deep interest in the case, and assures the patient that the condition is physical and not "just nerves," will obtain better results than many another. The patient should be warned that despite the correct glasses, if he is worried or depressed, he will have temporarily a return of the asthenopia. Ross believes that if this were done, the patients would not suffer in the prolonged way that is so common among them.

Ross's communication, written by a general physician, deserves to be widely read in the original by ophthalmic surgeons. It is distinctly helpful.

SYDNEY STEPHENSON.

(3) The conclusions reached by **Kahn**, of Detroit, are as follows :—" 1. The most constant symptom of migraine is headache, with or without nausea or vomiting. 2. The characteristic symptom of migraine is periodicity. 3. The only known cause is eyestrain. 4. The sole cure of migraine is correct glasses. 5. Good distant vision and ability to read with "comfort" does *not* exclude eyestrain. 6. In many of the worst cases weak lenses only are required, but these must be of the most right kinds. 7. The ages of the patients ran from 4 to 52 years. 8. The seriousness and frequency of the attacks increase with age. 9. Failure of glasses to cure migraine is almost certain to be due to faulty refraction work."

XII.—REMEDIES.

(*Third notice*).

(1) Stieren. Edward. Salvarsan in ophthalmology. *Ophthalmic Record*, January, 1915

(2) Carpenter. E R —A case of keratoconus cured with high frequency spark *Ophthalmic Record*, January, 1915.

(3) Reber. Wendell and Lawrence. Granville A —Gonorrhœal iritis as a manifestation of an old latent gonococcemia. diagnosed by the complement fixation test. treated with bacterins *Ophthalmic Record*, January, 1915.

(4) Siegrist, A. and Schenderowitsch, P.—The treatment of gono-blennorrhœa in the new-born and in adults in the University eye clinic of Berne. (Die Behandlung der Gono-Blennorrhöe der Neugeborenen und Erwachsenen an der Berner Universitäts-Augenklinik.) *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

(5) George, Edgar J.—Electrolysis in the treatment of trachoma and its sequelæ. *Ophthalmic Record*, March, 1915.

(6) Gradle, Harry S.—The specific treatment of Morax-Axenfeld conjunctivitis. *Ophthalmic Record*, April, 1915.

(7) Temple-Smith, E. — Interstitial keratitis. *Medical Journal of Australia*, May 22nd, 1915.

(8) Tooke, Frederick.—The inefficacy of iodoform in a case of tuberculous iritis. *Ophthalmology*, July, 1915.

(9) Rodriguez, Santiago Diaz. — Nodular opacities of the cornea. A contribution to the study of their treatment. (Opacidades nodulares de la cornea. Contribucion al estudio e su tratamiento.) *España Oftalmologica*, October 15, 1915.

(10) Garcia-Mansilla.– Arseno-bensol, "606," in ocular affections. (El arsenobensol, "606," y las afecciones del aparato de la visión.) *Archivos de Oftal. Hisp.-Amer.*, 15 Diciembre, 1915.

(11) Jefferson, Frederick and Armstrong, W. E. M.—A method of treatment for conjunctivitis. *Brit. Med. Journal*, March 4th, 1916.

(1) **Stieren**, of Pittsburg, reviews the literature of the use of salvarsan in ophthalmology. "In spite of the present day perfect *technique*, and the further elaboration of it by Swift and Ellis, reports of sudden blindness or impaired vision following the use of salvarsan continue to bob up with the persistence of Banquo's ghost." Ocular paralyses seem to be more frequent in cases treated by salvarsan than in syphilitics treated by other methods. In spite of statements to the contrary, Stieren believes that salvarsan does promote primary optic atrophy when it has already begun, but with the less intensive *technique* of Swift-Ellis, nerve tissue may be conserved, and the para-syphilitic affections of the cerebro-spinal axis may be effectively checked, and this should be the chosen method of administration if salvarsan is to be used in the treatment of optic atrophy and neuritis, or in oculomotor paralysis. J. JAMESON EVANS.

(2) **Carpenter**, of El Paso, Texas, records a case of keratoconus, with a vision of 10/200, with a minus 10 D. sphere, which was treated by the application of the effluve from a needle point held almost in contact with the cornea, so that the spark should strike only the conical portion of the cornea just for a second. This application was repeated four or five times, and was followed by much local reaction and pain, but a month later, there was marked haziness and shrinkage of the cornea, and a decided improvement in vision. Two months later, the conicity and scarring were hardly apparent. V.=20/50 —10 D. Eighteen months later, V.=20/30, with correction for myopic astigmatism. J. JAMESON EVANS.

(3) **Wendell Reber** and **Lawrence**, of Philadelphia, record three cases of iritis following gonorrhœal infection which were successfully treated by means of Neisser sero-bacterins. The primary gonorrhœal infections had occurred

fifteen and five years previously. The diagnosis was confirmed by the complement-fixation test.

The effect of the bacterins was immediate, pronounced, and permanent. In one case it seemed to affect favourably the albuminuria and pyuria from which the patient was also suffering. Three injections, at intervals of forty-eight hours, were enough to bring about a cure.

In acute cases the authors advise the use of stock vaccines, and in such cases it is emphasised that sensitized bacterins offer much the speediest results.

To confer long-continued immunity after a cure has been accomplished, it is altogether probable that non-sensitized bacterins will be of more value than sensitized ones. J. JAMESON EVANS.

(4) **Siegrist and Schenderowitsch**, of Berne, state that since the year 1907, they have given up the use of silver nitrate in the treatment of gonorrhœal ophthalmia, using in its place at first collargol and latterly syrgol. Their method is as follows: collargol in 3 per cent. solution is dropped in after cleansing the conjunctival sac with 2 per cent. boric lotion. At first this is done every hour, later every two or three hours. Half an hour after each application a little boric vaseline is inserted, and then for half an hour a warm boric compress is applied. During the night the irrigation and application of ointment are continued every two hours as long as there are gonococci in the exudate. The same method is employed with syrgol, but the strength of the drops is 5 per cent. The results of 96 cases are tabulated, and these should be examined in the original, but it may be mentioned that there were 37 cases of ophthalmia neonatorum treated with collargol in which no complications were present at the beginning of treatment and these were all cured without complications, the average duration being 21 days. The same applies to 32 cases of ophthalmia neonatorum treated with syrgol, with an average duration of 22 days. The authors are of the opinion that both substances showed good results in all classes of cases, and with very little to chose between them. The disadvantage of collargol is the dark staining of dressings, etc., while syrgol, if used in quantity, gets down through the nose and throat, and leads to offensive diarrhœa. A. J. BALLANTYNE.

(5) **George**, of Chicago, treats trachoma by electrolysis by means of a specially devised copper electrode with a smooth flattened olive-shaped tip that will glide over the surface of the conjunctiva without causing irritation. The eye is anæsthetised with cocain and adrenalin, and a current of five milliamperes is gradually turned on, while the operator applies the electrode (positive pole) to the everted lids for about 3 to 5 minutes each. One or two treatments a week will effect a cure in time and that "with complete restoration of the conjunctiva to normal without cicatricial involvement in cases of not long standing or those that have not been previously treated by caustics." J. JAMESON EVANS.

(6) **Gradle**, of Chicago, speaks highly of the efficiency of the fluorescein-zinc compound in the treatment of Morax-Axenfeld conjunctivitis. The best results seem to follow a light dusting of the (reddish-yellow) powder on to the lower tarsal conjunctiva with a cotton-wrapped applicator with which light massage is made. With few exceptions, one application is sufficient to complete the cure. Equally good results follow its use in "those persistent low-grade, non-purulent, blepharo-conjunctivitis with a multiplex bacteriological flora." The application occasionally has to be repeated once or twice. It is accompanied by a little irritation and tears of a yellowish-green tint, but these symptoms are not particularly distressing. J. JAMESON EVANS.

(7) **Temple-Smith**, of Sydney, describes the signs and symptoms met with in Australian patients suffering from interstitial keratitis. He believes that a

negative Wassermann reaction in such cases is strong evidence in favour of a tuberculous origin. For diagnostic purposes, he used 1 mgr. of O.T. If no reaction resulted, 5 mgr. were given, and then 10 mgr. If a reaction was obtained, he put the patient on a course of tuberculin treatment. Bacillary emulsion was used, beginning with 1/40,000 mgr., and doubling the dose every third day unless a reaction occurred. Later, the increase was reduced to half the dose up to 1/2 mgr. If no improvement resulted, the bovine strain of new tuberculin was substituted. Subconjunctival injections of normal saline solution were given at the same time. Marked improvement was usually seen after two to four weeks. R. H. ELLIOT.

(8) The patient referred to in the paper by **Tooke**, of Montreal, was a girl, aged 18 years. The eye showed redness, irritation, photophobia, and commencing interstitial opacity of the cornea. A few days later, the opacity became patchy and denser, with some roughening of the epithelium. Infiltration increased The iris became studded with grey nodules, and there were posterior synechiæ. Tuberculin and sanatorium treatment being out of the question, powdered iodoform was introduced into the anterior chamber, and thereafter, for three months, the patient received one or two injections each week of 20 per cent. iodoform emulsion. The condition was cured, but six weeks later, there was a relapse, and iodoform was again introduced into the anterior chamber. The eye continued to give trouble, and was ultimately removed at the patient's request. Microscopic examination of the eye revealed typical tubercles. A. J. BALLANTYNE.

(9) In this paper **Rodriguez**, of Vigo, discusses the nature and treatment of certain nodular opacities in the cornea which he has observed in some cases of trachoma; he regards them as being of the same nature as those described by Groenouw, and later by Fuchs. It occurs to the reviewer that the opacities in the Rodriguez cases may have been rather of the nature of those described for the first time by Calderaro in *La Clinica Oculistica*, March, 1910, and reviewed in this journal (*see* THE OPHTHALMOSCOPE, 1910, p. 533).

Whatever the nature of the opacity, the treatment seems to have been remarkably successful. It consisted in the application of electrolysis, in the following way: after instillation of cocaine, the positive pole is given to the patient to hold and the negative pole is attached to an electrolytic lacrymal sound (whether of silver or platinum is unimportant), and the nodules are touched with this probe. The current is gradually increased until it reaches 1 milliampere. The sound is moved constantly over the surface of the nodules, in order that the action may be equally distributed over the whole diseased area, and not too long continued in any one part. It is not said how long each sitting is; but at the end the current is lowered gradually.

After the treatment, there is some pain for a few hours and photophobia for two days, and then the cornea is seen to be vascularised. These vessels disappear after a short time, and the cornea remains much more transparent. In the cases given by Rodriguez the visual acuity rose from 1/50 to 1/3.

H. GRIMSDALE.

(10) **Garcia-Mansilla**, of Madrid, has examined a large number of cases of ocular syphilis in which "606" was given. He has seen a considerable number of individuals in whom, after an apparent cure by "606," ocular symptoms were observed, which yielded in some instances to further doses of the same drug, but generally were treated by mercury. He does not think that in any case the ocular condition was caused by the remedy, but that the apparent cure was not complete. He is of opinion that "606"

should seldom, if ever, be used alone, but always, where possible, in combination with mercurial treatment. H. GRIMSDALE.

(11) The treatment recomended by **Jefferson** (R.A.M.C.) and **Armstrong** (R.A.M.C.) is by irrigating the conjunctival sac freely three times a day with eusol.* As to strength, the authors are delightfully vague. It appears that "a solution about five times more dilute than the normal strength used for wounds gave the optimum effect in the treatment of conjunctivitis,"

SYDNEY STEPHENSON.

XIII.—MISCELLANEOUS.

(1) **Contino.**—The size of the image in the indirect ophthalmoscopic examination. (Sulla grandezza dell'immagine oftalmoscopica rovesciata.) *La Clinica Oculistica*, May-June, 1914.

(2) **Schoute, G. J.**—The oldest Dutch text-book of ophthalmology. (Das älteste holländische Lehrbuch der Augenheilkunde.) *Centralbl. f. prak. Augenheilkunde*, August-September, 1914.

(3) **Davis, Michael M., and Hartshorn, Edward.**—A self supporting eye clinic for working people. Report of the first year of an experiment at the Boston Dispensary. *Archives of Ophthalmology*, November, 1914.

(4) **Grossman, Karl.**—Sight testing for sailors. *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(5) **Cockayne, E. A., and Attlee, John.**—Amaurotic family idiocy in an English child. *Proceedings Royal Society of Medicine: Section of Ophthalmology*, March, 1915.

(6) **Smith, Priestley.**—A trench periscope. *Proceedings Royal Society of Medicine: Section of Ophthalmology*, March, 1915.

(7) **Shahan, William E.**—Some convenient stereoscopic figures. *American Journal of Ophthalmology*, March, 1915.

(8) **Fuchs, E.**—The influence of the cataract operation upon the intelligence. (Einfluss der Star-Operation auf die Intelligenz.) *Centralbl. f. prak. Augenheilkunde*, November-December, 1915.

(1) The size of the inverted image varies, says **Contino**, of Rome, with three facts: (1) the power of the lens used, (2) the state of accommodation of the observed eye, and (3) the static refraction of the same. (The distance at which the lens is held has also an important bearing, except in emmetropic eyes.) It is hardly as well-known as it should be that for many purposes at least a 9 D. or 10 D. lens gives a more satisfactory inverted image than the 13 D. or 14 D. which is commonly provided. Contino gives a series of tables showing the size of the image in varying degree of error; he does not show, however, a point which was brought out thoroughly and clearly in a little book by Bjerrum, *viz.*: the varying size of the image in ametropic eyes when the distance of the lens varies. In emmetropia, the size does not vary, in myopia

---

* "Eusol" is a fancy name applied to a 0.5 per cent. solution of hypochlorous acid, recently lauded as a universal antiseptic.

the size, which is always smaller than in emmetropia, increases as the distance of the lens increases. In hypermetropia the image is larger than normal and decreases as the distance of the lens increases.

Contino shows that the alteration of size varies with the form of error; thus an axial myopia of 5·0 D. will not give the same sized image as a myopia of curvature of the same degree.

Contino advises, so as to secure a uniform size for the inverted image, that we should employ lenses of different strength, weaker for myopia, stronger for hypermetropia. HAROLD GRIMSDALE.

(2) Guillemeau's "Des Maladies de l'Œil" appeared in 1585, and a Dutch translation was published in 1597 by Carolus Battus, and this is claimed by **Schoute**, of Amsterdam, to be the oldest text-book of ophthalmology in the Dutch language. Schoute shows that the translation printed some eighty years later by Johannes Verbrigge was made, not from the original French, but from Battus's translation. SYDNEY STEPHENSON.

(3) **Davis** and **Hartshorn**, of Boston, give an account of an interesting sociological experiment, the intention of which is to provide skilled ophthalmic assistance to the class of patient who is able and willing to pay a small fee, but who cannot afford to visit the regular eye surgeon. Another leading feature of the scheme is that the clinic is held at night, in order to suit the convenience of its working-class clients. Two main ideas have been kept before the minds of the promoters of this enterprise, *viz.*, (1) to avoid pauperising people who belong to a class which is independent by nature, and (2) to afford aid of such a nature as to defy thereby the competition of quacks and even of qualified opticians. The "Evening Eye Clinic" has all but paid its way in its first year, and the only danger would appear to be that its popularity will bid fair to make the demand outstrip the possible facilities for meeting it. A careful perusal of the paper can be recommended to all, be they ophthalmic surgeons or laymen, who take an interest in sociological questions. R. H. ELLIOT.

(4) At the International Medical Congress, London, 1913, the Ophthalmic Section passed resolutions agreeing to the formation of an international committee to report on suitable standards and suitable methods of testing for colour, light and form vision in sailors, in the interest of safety at sea. Apparently, that committee has not yet been formed.

Grossman, of Liverpool, hoped to induce the Petrograd Congress to discuss a number of questions bearing on the matter, some of which were: What is a fair and reasonable standard of form vision to expect? What is the simplest and best method of testing the V.A.? The lantern being the best method of testing colour vision, should it be employed in the consulting room only or in the open in selected places? Should colours be named or only matched? What is the best method of testing the light sense? What standard of light sense should be required? What is the most serviceable and practical apparatus? Should sailors be tested with reference to their field of vision and binocular vision? A. J. BALLANTYNE.

(5) The case of **Cockayne** and **Attlee**, of London, was in a male child, aged one year, who apparently was of pure English descent.

(7) The method of ascertaining whether or not the normal binocular function exists in children who have been squinters and who have been so far cured as to look straight, devised by **Shahan**, of St. Louis, has the merit of extreme simplicity. It is, however, not very easy to describe in a few words. On a single card, such as will fit the particular stereoscope in use, three identical designs are placed, the upper ones at 72 mm., the middle ones at 66 mm., and the lowest ones at 60 mm. apart. In the vertical direction

there should be about 5 mm. between each pair. To make the story as short as possible, when these designs, arranged in this way, are observed through the stereoscope by a person with binocular vision, the designs farthest apart will appear largest and furthest away, while those nearest together will appear nearest the patient and smallest. The intermediate ones occupy an intermediate position. To give the explanation would mean transcribing the article, so we may be content to quote the author's facts. A plan for making the card is given in the article. ERNEST THOMSON.

(8) **Fuchs**, of Vienna, reports the case of two old persons from whom cataract was successfully removed, with the consequence that a striking improvement took place in their intelligence. SYDNEY STEPHENSON.

BOOK NOTICES.

With the greater part of Europe in flames, it must appear strange to the combatants that there should be any thought but for the war. It seems, therefore, an unpropitious time for the starting of a new journal of ophthalmology. We have received, however, two numbers of a bi-monthly journal, *España Oftalmologica*, which has been started at Cadiz, under the editorship of Messrs. de Arana Quintana and Diaz Rodriguez, with the collaboration of distinguished Spanish and Spanish-American oculists. The editors regret the small output of Spanish ophthalmology, and hope that with the increased interest which is being taken in this branch of medicine in Spain, Spanish will become one of the languages recognised at the International Congress. They will not be content with merely noting the progress of ophthalmology in other countries; their chief desire is to find that Spain will take her proper place among the other nations. And their aim is to cultivate, as far as in them lies, the study in their own land. In this we wish them all success. H. GRIMSDALE.

The American Encyclopedia and Dictionary of Ophthalmology. Edited by CASEY A. WOOD, M.D., C.M., D.C.L., assisted by a large staff of collaborators. Volume VI. Dioptric System to Exophthalmitis. Chicago: Cleveland Press, 1915.

The sixth volume of the American Encyclopedia contains an exceptionally long article on Examination of the Eye by A. S. Rochester, of Chicago. This extends to 220 pages. It is no ordinary text-book chapter, but represents a real effort to place under one heading all that the expert—more particularly—requires to know about modern methods of examination.

Commencing with the taking of Case-histories—would that all had the time to take case-histories so completely—the author passes on to consider the usefulness of Blood-pressure records by the sphygmomanometer, the importance of the part played by Toxæmia in eye disease, the Wassermann reaction, and Abderhalden's cancer test. Browning's work and that of Lang are the principal sources of information regarding toxæmia and oral sepsis. The Abderhalden test is described in full by means of a long quotation from the [illegible] F. Ball.

The Objective Examination of the patient is quite minutely done. For instance, much space is occupied in describing the method of estimating the temperature of the conjunctiva by the thermocouple of Lucien Howe, and the various methods of exophthalmometry.

In the paragraphs devoted to Pupil Reactions, the various devices for bringing out the hemiopic pupil reaction, especially the somewhat complex apparatus of Walker, are fully described.

Intraocular Tension requires a long description, and there are some interesting paragraphs on the relationship of tonometer findings to intraocular drainage.

Visual Acuity, as a function of the nervous apparatus of the eye, and as independent of refraction errors, is closely insisted upon. Jackson has said that "as a standard for visual acuity test-letters belong to the stage of mental and scientific development when the standard for length was 'three full grains of barley-corn taken from the middle of the ear' or 'the distance a man can walk between sunrise and sunset.'"

Various kinds of Test-type receive, perhaps, rather more notice than they deserve, and yet, it is strange to note that types composed of the small letters of the alphabet are not mentioned. Such types are published, and the reviewer wonders how, in dealing with school children of tender years, he ever got on without them. They may not be scientifically scaled; they may be of no use in estimating scientifically the visual acuity; but of their value in practice there can be no doubt whatever.

Regarding tests for the detection of defects in the Colour-Sense, pride of place seems to be given to Jennings' modification of the wool test, in which the candidate makes a permanent record of his own colour-sense.

Perhaps the most outstanding feature of the paragraphs on the Ocular Muscles is the enthusiasm of the author for the well-known diaphragm test of N. Bishop Harman, and the excellent description which he gives of its various uses. The Maddox near-vision phorometer is not illustrated, although said to be. The wing test of Maddox *is* illustrated and is fully described. Considerable attention is paid to the ophthalmic ergograph of Lucien Howe. This apparatus gives a "staircase" tracing of fatigue of the ocular muscles on a revolving drum.

The reviewer is disappointed with the account here given of Retinoscopy, and trusts that more will be said under the letter R. What we have here is certainly neither scientific nor very practical. Nor could a *learner* make much practical use of the paragraphs dealing with the correction of refraction errors. He would soon lose his way. The author seem to confine himself to the standpoint of the specialist who may wish to consult the volume as to methods. Very possibly, he may be right in taking this attitude, but, even so, he seems hardly equal to himself in this particular matter.

The paragraphs on Ophthalmoscopy deal very completely with instruments, but avowedly the general study of the subject is left over to be dealt with under the letter O. A statement on page 4,762, that "all well-qualified oculists should be able to thoroughly examine the fundus of an eye through an undilated pupil," surely requires modification. To begin with, the eye in question must be presumed free of opacities in the media—a very large assumption—and the pupil must not be unduly small if the fundus is to be "thoroughly examined" by the direct method. Apart from the eye of the patient, there are individual differences in the ability of the eyes of individual skilled observers to get past a small pupil. As to the indirect method, useful though it is, especially when a small pupil or partially opaque media are in the way, the reviewer is convinced that the method is one by which a great deal of detail can be lost, and is lost, by those who use it to the exclusion of the direct method. Therefore, one cannot " thoroughly examine " the fundus by means of it alone.

Lastly, Perimetry is very well and fully described.

Regarding the other articles in this volume, a mere indication of some of them must suffice.

The biographies of Donders and of Dor are sympathetically written. Articles on Ectropion and Entropion are useful from the operative standpoint. A page and a half on the subject, " Eel, the eye of," contains an absolute minimum about eyes, but a good deal about eels. Cataract appears again under " Discission " and " Electric." There is quite a little treatise on Electricity in ophthalmology, electrolysis, the electro-magnet, and the electric ophthalmoscope.

The difficulties about Embolism of the Central Artery are discussed. Entoptic Phenomena might have been elaborated to a greater extent on account of the interest attaching to the subject. Enucleation of the eye and its substitutes is a long article of 100 pages, freely and well illustrated and, as the French say, " *documenté*." " Probably no operation," says the writer, " will ever deprive some form of simple enucleation of its well-deserved popularity."

It is said, regarding Eserine, that, "American patients seem very susceptible to the irritation that follows the use of eserine (especially the sulphate) and it cannot be used in the doses ($\frac{1}{2}$ to 1 per cent.) generally prescribed by European writers." Surely a rather remarkable fact.

Forty pages on Exophthalmic Goitre are to be read along with the article on Basedow's disease in a previous volume, although the present article is very much the longer of the two and deals largely with operative treatment. Still, the separation of these two articles, the one in the second volume, the other in the sixth, is a fair example of the overlapping and want of self-containedness which seem to be inseparable from any encyclopedia.

Finally, one may mention an interesting, very instructive, and at the same time concise article on Ethnology of the Eye, in which are explained many peculiarities of the eyes, and more especially the adnexa, of different races.

ERNEST THOMSON.

NOTES AND ECHOES.

Deaths.

We regret to announce the death of Benjamin Joy Jeffries, of Boston, formerly ophthalmologist to the Massachusetts Charitable Eye and Ear State Hospital, at the age of eighty-two years.

From Chicago the death is announced of Charles Heady Beard at the age of sixty years. Beard had held the posts of surgeon to the Illinois Charitable Eye and Ear Infirmary and ophthalmic surgeon to the Passavant Memorial Hospital. He was a member of the American Ophthalmological Society, the American Academy of Ophthalmology and Oto-Laryngology, and the American College of Surgery. He was also a member and an ex-president of the Chicago Ophthalmological Society. Beard was the author of volumes on " Ophthalmic Surgery : A treatise on surgical operations pertaining to the eye and its appendages, with chapters of para-operative technic and management of instruments" (1910) and "Ophthalmic Semiology and Diagnosis" (1913) belonging to Pyle's International System.

From the Continent the deaths are announced of Professor B. Wickerkiewicz, of Cracow, at the age of fifty-eight years, and of Georges Haltenhoff, Professor of Ophthalmology in the University of Geneva.

* * * *

Appointments.

JOHN GILCHRIST has been appointed surgeon to the Victoria Eye Infirmary, Paisley, *vice* N. G. Cluckie, appointed consulting surgeon.

* * * *

Honoraria.

IN consequence of the extra work thrown upon the staff of the Norfolk and Norwich Eye Infirmary by the war, the governors of the institution have voted an honorarium to the members of the honorary staff.

* * * *

American Academy of Ophthalmology.

IT is announced that the twenty-first annual meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held at Memphis, Tenn., on December 5th, 6th, and 7th, 1916.

* * * *

Blinded Soldiers.

REPLYING to Mr. Tyson Wilson in the House of Commons on February 24th, Mr. Tennant said: The number of non-commissioned officers and men rendered totally blind in the present war and discharged between the outbreak of the war and January 31st, 1916, is 65, distributed as follows: Privates, 59; corporals, 4; sergeant, 1; and company sergeant-major, 1.

* * * *

"La Clinica Oculistica."

WITH the last number of the fifteenth volume, which we have just received, the Italian journal, *La Clinica Oculistica*, comes to an end, at least in its present form; it is to join the *Annali di Oftalmologia*, and the two will continue to appear under the title *Annali di Oftalmologia e Clinica Oculistica*.

In the same number, the editors of the journal announce the formation of of a new "Societa Oftalmologica d'Italia." It is strange that the ophthalmologists of Italy, who have done so much excellent work, both on the clinical and scientific side, have waited so long before founding such an institution, which can have no other effect than to increase the general interest in ophthalmology, and benefit not only their own nation, but the whole world.

* * * *

Optical Glass.

WE make no apology for reprinting the following interesting article, published by *The Observer* on January 30th, 1916:—

OPTICAL GLASS.

Optical glass is one of the key industries. It bears the same relation to other British industries that the lenses of a microscope bear to the instrument as a whole. The scrap value of a £30 microscope is perhaps half a sovereign. The glass is not worth twopence; the brass is worth a few shillings: all the rest of the £29 odd is skilled labour and manufacturer's profits. So with optical glass, which is not a vast trade, though one of the highest skill, but on which nearly every other skilled trade is dependent. Long before the war broke out Dr. Walmsley warned the Government that we were quite unable to find in England the glass for making telescope sights, range-finders, binoculars. But it is not only the trade of war which wants optical glass. Brewers want it; sugar distillers want it for polariscope lenses; ironworkers want it; engineers want it; surveyors want it; dye manufacturers want it; in short, there is hardly any skilled business from photography to electrical apparatus that does not employ some optical instruments. We need hardly add that without it typhoid could not have been eliminated from the Expeditionary Forces by the bacteriologists, who want microscopes; and surgeons and doctors could not have simplified the surgery of wounds.

How does England stand about optical glass? It does not stand at all. It leans on Germany, and on the Jena glass works. That is not to say that there are no scientific glass manufacturers in England. There is one first-class firm. But for cheap optical glass, for glass which fulfils the exact purposes for which it is required, for the standard article, the British instrument maker goes to Germany—and pays through the nose. That is to say, the Jena glass works are in this position—that they can say, "We will supply you with this, or with that variety of optical glass, but you must only use it for this or for that purpose. We sell it to you (under heavy guarantees and penalties) for use in microscopes. You are forbidden to use it for photographic lenses." The reason of the stipulation is that the Germans very naturally desire to keep the cream of the business of instrument making in their own hands. They can do it. There is not a vast amount of profit in the ten thousand cheap microscopes sold to England each year; but the monopoly of the Jena glass works is worth a good deal. It has been arrived at by quite simple means; and the story of it is worth telling, because the optical glass industry is one in which it is easy to put a finger on English sins of omission.

Abbé was a professor in the laboratory at Jena, who worked in a scientific spirit at a problem which was agitating in 1871 optical manufacturers all over the world—namely, the elimination of colour defects from lenses. His papers attracted the attention of a Dr. Schott, who was a glass manufacturer—note that he had a doctor's degree, though he was a manufacturer. Schott came to Jena to help Abbé with the meltings of glass, and they began to work on a larger scale. But it is quite possible to drop £200 over one melting and get no satisfactory result. So they progressed slowly. Then the Prussian State came down with a handsome subsidy: and the works were established, not on a laboratory, but a manufacturing scale. By that time Abbé and Schott knew positively and with scientific precision how to make optical glass of thirty different kinds. The Jena glassworks can now produce seventy, and the British optical instrument maker looks glumly at them and says their position is unassailable.

So it is, if England wrings her hands—or keeps them in her pockets—as she has done for the last eleven years. In 1902, Dr. Walmsley, who had instituted classes for the study of optical glass in Clerkenwell, at the Northampton Institute, with a view of educating skilled workers in the industry, appealed for help. The Technical Education Board thought the scheme an excellent one. They recommended it to the L.C.C. in 1904. The L.C.C. thought it a good scheme and referred it on. It has been referred on ever since, everybody blessing it, and putting it by till another day. Meanwhile the Northampton Institute, having mortgaged £13,000 of its own money, awaits the day when this benevolent interest shall crystallise into some practical step. When it does, Clerkenwell may breed a new class of highly skilled optical glass workers and instrument makers, and recover an industry at which we were first in the world. But it will not be done unless somebody is prepared to risk money on it. The manufacturer does not see it.

E. S. G.

THE OPHTHALMOSCOPE DIARY.

	1916.	
Midland Ophthalmological Society.	April 4th	Birmingham.
Ophthalmological Society of the United Kingdom.	May 4th, 5th, & 6th	London.
American Ophthalmological Society.	May 9th & 10th	Washington, D.C.
Midland Ophthalmological Society.	June 6th	Eye Hospital, Cheltenham.
Royal Society of Medicine: Section on Ophthalmology	June 14th	1, Wimpole Street W.
Oxford Ophthalmological Congress.	July 13th & 14th	Keble College, Oxford.
American Academy of Ophthalmology and Oto-Laryngology	Dec. 5th, 6th, & 7th	Memphis, Tenn.

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ORIGINAL COMMUNICATIONS

PNEUMOCOCCAL INFECTION OF THE EYE.

BY

N. C. RIDLEY, R.N., M.B., F.R.C.S.,

LEICESTER, ENGLAND.

PRESIDENT OF THE MIDLAND OPHTHALMOLOGICAL SOCIETY.

WHEN an organism attacks the deeper parts of the eye there is greater difficulty in identifying it than is the case when almost any other part of the body is affected, for it is seldom that the globe can be opened for the purpose of taking a culture or smear without doing more harm to that organ than the occasion justifies.

We therefore find it necessary to seek indirect evidence to determine its nature.

Unless there have at any time been an open wound, the entry of the offending microbe must be by the blood-stream. Cultures, therefore, of the blood should be taken, and in some instances this is successful. It is, however, by no means certain, as the organism may vary in number from time to time, occasionally being very few and so easily missed by failing to grow on the medium. In such a case, then, a routine examination of all parts which may serve as sources of infection should be made, such as sputum, tonsil crypts, nasal sinuses, the gums and dental cavities, the urine, fæces, and so on.

If in several of these, one finds a constant and preponderating presence of a certain organism, it is justifiable to suspect its pathogenic influence.

If then a vaccine prepared from this be adminstered, and a distinct reaction follow, practical confirmation of its part in the causation of the trouble is obtained.

Of course, the disease may be a mixed infection, in which case positive results would be obtained with more than one organism.

The difficulty and expense, both in time and material, of conducting an elaborate examination such as this, makes it prohibitive in most cases, and, no doubt, many cases of iritis, iridocyclitis, and so on, run their course, and get well or go to the bad without our knowing for certain what was the actual cause of the disease.

No doubt the vast majority are due to septic absorption, *i.e.*, the staphylococcus albus or aureus, to syphilis, tubercle, or gonorrhœa. In such cases there is frequently outside evidence of its nature, and most of these organisms are improved by the administration of mercury as a blood antiseptic, whichever they may be due to.

Occasionally, however, one comes across a case where routine treatment is of no avail, and then it is necessary that the more elaborate steps for forming a correct diagnosis should be taken.

The occurrence of such a case recently in my practice has led to my writing this short paper.

It is a case of iritis in a medical man practising bacteriology, which one took to be tuberculous from certain peculiarities, such as the localisation of the affection to certain parts of the iris while other parts were free, the fact that the ciliary body also had patchy foci, and that the patient was a pale man in a poor state of general health, with a history of attacks of pleurisy. Nor was there anything in the history or symptoms to suggest any of the other usual causes of the disease.

However, treatment with tuberculin in carefully graduated doses, together with the ordinary local applications, failed to clear up the case, and so the more elaborate methods of diagnosis had to be resorted to. I might say that the opsonic index for tubercle was not found to be unduly low.

In consequence of this, the following pathological investigations were made by Dr. E. Carnegie Dickson :—

1. Wassermann reaction, which proved negative.
2. Urine, sterile, and showed no abnormality.
3. Blood count was normal.
4. Teeth showed pus round some dead roots, and this pus contained large numbers of pneumococci and streptococci.
5. Cultures from the post-nasal region showed large numbers of pneumococci, with some streptococci.
6. The fæces showed enormous numbers of pneumococci.
7. The blood gave a pure culture of pneumococci.

An examination of the chest showed no clinical signs of tubercle, but it was thought the condition of the left base suggested a small area of collapsed lung held down by adhesions, probably dating from childhood.

The complement deviation test for gonococci and staphylococci was found to be negative.

Examination of the antra and other sinuses gave negative results, and there was no enlargement of tonsils nor excess of adenoid tissue.

An X-ray examination of the teeth was made and in those cases which showed absorption of bone the offender was removed, as were also all dead roots.

It is hardly necessary for me to tell you that the pneumococcus is a lanceolate-shaped diplococcus, first described by Pasteur.

It is composed of two lance-shaped cocci placed base to base and surrounded by a capsule. It stains Gram-positive, grows on most ordinary media, but most luxuriantly on those containing serum or fresh blood.

In culture the capsule is lost and the virulence decreased ; the latter can be maintained in sub-culture by growing on media moistened by fresh rabbit's blood.

It is, of course, best known as the cause of pneumonia, and from the ophthalmological point of view, its other places of residence and attack in the human body are of great importance.

These may be divided into :—

1. Epithelial-lined closed cavities.
    - (*a*) Pleura.
    - (*b*) Pericardium.
    - (*c*) Joints.
    - (*d*) Peritoneum.
    - (*e*) Meninges.
2. Mucous surfaces in more or less closed spaces with narrow openings.
    - (*a*) Frontal sinus.
    - (*b*) Ethmoid sinus.
    - (*c*) Sphenoid sinus.
    - (*d*) Antrum.
    - (*e*) Middle ear.
    - (*f*) Bladder.
3. Surface infections.
    - (*a*) Buccal.
    - (*b*) Pharyngeal.
    - (*c*) Intestinal cavities.
    - (*d*) Conjunctiva and lacrymal sac.

4. Presence in infected pus-producing sinuses and surfaces.
   - (*a*) Oral sepsis, round dead roots of teeth.
   - (*b*) Tonsil crypts.
   - (*c*) Adenoids, etc.
   - (*d*) Wound sinuses.
5. Tissue infections, (*a*) cellulitis, (*b*) myocarditis, and (*c*) splenitis.

Pneumococci inhabit practically 100 per cent. of all normal mouths, bronchi, and conjunctival sacs at one time or another (Axenfelt 88 per cent.)

Whenever there is a local point of active pneumococcal infection, the cocci almost invariably manage to enter the blood-stream. Thus, in ordinary lobar pneumonia, careful blood cultures will show septicæmia to co-exist.

This septicæmia produces not necessarily a high temperature but general toxæmic symptoms, malaise. limpness, low blood pressure, etc., in short, there seems to be no end of the variety of acute pneumococcal infections, in all of which the pneumococcus may get into the blood-stream.

It is not surprising that in such cases of toxæmia the uveal tract can be easily attacked, especially when its resistance is weakened by prolonged exposure, overstain, or traumatism of any kind.

The pneumococcus exerts its morbific influence by means of an endo-toxin. It is not liberated until it is freed by leucocytic digestion of the coccus. In consequence, the attack of systemic infection does not produce any large amount of anti-bodies in the serum.

Immunity after attack is of short duration, perhaps only two or three weeks.

One pneumococcic infection rather tends to render the individual more susceptible to another.

Remembering this in connection with a local point of chronic pneumococcal sepsis, in which also uveal infection has occurred, it can be seen that so long as a septic focus remains, constant relapses and crises will tend to occur in the uveal condition, due to rapid re-infection of the blood-stream, and the absence of anti-bodies, there being the necessity of a fresh leucocytosis before the attack can be stopped.

In the case that I bring forward we can trace three distinct sources of infection, the first being in childhood, when there was an attack of broncho-pneumonia following measles (1893); secondly, a wound infected when operating on a case of empyæma, when cellulitis of the arm supervened, from which a pure culture of pneumococcus was obtained (1907); and thirdly, an infection by inhalation of dried sputum while at work in the pathological laboratory, which produced a chronic dry pleurisy (1912).

The present attack began very insidiously and quietly in 1914, with muscæ volitantes, which persisted for nearly twelve months without any other signs or symptoms, the right eye being the one affected, which was the one habitually used for microscope work.

On 1st April, 1915, there was slight redness and irritation of the conjunctiva, following a long train journey. This was succeeded by definite signs of iritis in about three days, so that when I saw the patient on the 12th April, the iris was dull, the pupil dilated with atropine and irregular in shape, and there was some exudation in the anterior chamber.

Improvement was slow but continuous, under ordinary treatment, although a fine shower of keratitis punctata was noted, until the 13th May, when there was an acute relapse, increased injection, iris muddy and yellowish, and small pupil.

This attack lasted five days, and it was observed that there were two parts of the iris, down and in, and down and out, which were more inflamed than the rest.

Improvement again took place, and was followed by another relapse in the middle of June.

When this had subsided, tuberculin was administered hypodermically every four days, beginning with a dose of 1/50,000th and increasing to 1/5000th milligram on the 23rd.

On the 24th, there was a fresh attack, which practically cleared up in five days.

The tuberculin was reduced to 1/12,500th and given in weekly doses for five or six weeks, but rapid small relapses occurred at intervals.

After this, a complete examination was decided on, as I have previously described.

The combined pneumococcal and streptococcal vaccine was prepared and administered, and was succeeded by an acute attack.

This followed every injection, until at last after four doses, each smaller than the preceding one, the vaccine was discontinued. The condemned teeth had been extracted four days before the first of these relapses.

The relapses now became fortnightly, and during this period, the vaccine was discontinued entirely.

These attacks were extremely painful, owing to secondary glaucoma produced by excessive exudation.

At the end of six weeks, vaccine was begun again with a 1/4 of a million of the combined vaccine.

The fortnightly attack following this injection was of an extremely mild character, and only lasted a day, and the vaccine was given at intervals of seven to ten days, and improvement continued with one or two very slight relapses until January 17th, 1916, when, the dose having been increased to 5,000,000, a slightly more severe relapse occurred.

The type of relapse which occurs at present is as follows.—A feeling of slight chilliness and depression comes on, usually in the forenoon, this is followed in about an hour's time by a very slight feeling of friction in the left pleura and simultaneously the eye reddens up and the fogginess of the vision increases in density. There is no pain nor tenderness in the eye, nor increase of tension, but a little watering and a little conjunctival irritation for an hour or so ; and on examination, the iris is found to be dull, especially below, and there may be two or three fresh fine spots of deposit on the back of the cornea.

The local treatment has consisted throughout of fomentations more or less continuously applied, according to the violence of the condition, the "wooden spoon method" being found most useful during the day.

Atropine drops were at first used four-hourly, but as irritation and general symptoms threatened, we had recourse to scopolamin.

The frequency and strength had to be varied from time to time, until recently one drop of gr.ij. ad ℥j. atropine daily has been found to answer best of all.

The iris is firmly bound down to the lens near the points of greatest inflammation, down and in, and down and out, as has been mentioned, but it seems to be free elsewhere.

Mercury was administered at first, by inunction, when the condition was supposed to be due to ordinary tooth sepsis ; but it only depressed the patient, and seemed to be of little benefit.

Easton's syrup and other tonics have been given from time to time.

I have described the vaccine treatment elsewhere, but would like to mention the difficulty we had in ascertaining the correct dosage. In eye diseases it is so very easy to do permanent harm by producing a too powerful reaction by an over-dose, that one has to proceed with the greatest caution.

Prognosis.

As to prognosis, in this case it is difficult to form an opinion, but from the fact that the only permanent mischief seems to be the posterior synechiæ, and perhaps some damage to the ciliary body in the lower part, and that the exudation material seems to be more of the serous than the plastic variety, clearing up at times to a very great extent, and allowing a good deal of a normal-looking fundus to be seen, with a corresponding return of vision, one is inclined to be quite hopeful of a complete cessation of the inflammatory attacks in time, leaving quite a useful eye.

How far the vaccine treatment may succeed in producing this desired result, depends on whether the pneumococcus and streptococcus are the only bacteria involved, or whether we have to do with another, such as tubercle, in addition. No doubt few cases are due to one organism alone, but are mixed infections.

The increase of intra-ocular tension did not exist long enough for much harm to have been produced by it. It was due to the blocking of the spaces of Fontana by exudation products, and was relieved by increasing the atropine and fomentations.

I have never had so anxious and long-continued a case of iridocyclitis in my experience, and it is the only one in which I have had reason to suspect the pneumoccocus as the cause, although, of course, one has repeatedly found that organism in conjunctivitis and corneal affections.

The only recorded case that I have been able to find is one by Browning,* although Axenfeld, in his "Bacteriology of the Eye," mentions such conditions as occurring, but without citing cases.

DIVERGENT CONCOMITANT STRABISMUS, THE MUSCULAR ANOMALIES AND REFRACTIVE ERRORS ACCOMPANYING IT, AND ITS TREATMENT.

BY

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FOR several reasons, an especial interest is associated with the study of the divergent form of concomitant strabismus. In the first place, as it is far less common than the convergent form, the ætiology of its various types, in so far as relates to the muscular anomalies present, has been less thoroughly discussed. In the second place, the difficulties attending its rectification by surgical procedures are generally held to be greater than those connected with the correction of convergent strabismus. Lastly, amblyopia of the squinting eye defying improvement by correction of the refractive error is by no means as common, and, if we believe that the irremediable amblyopia of strabismus is for the most part congenital and not acquired, does not seem to present itself as an ætiological factor as frequently as in the convergent variety. While it must of course be admitted that a corneal opacity or a unilateral cataract, especially in an adult, will in many cases determine which eye shall diverge, it is certainly more common in divergent than in convergent strabismus, and particularly in divergent strabismus associated with bilateral myopia, to find the vision equal, or nearly equal, in the two eyes after correction of the refractive error.

Divergent strabismus is quite generally regarded simply as a condition diametrically opposite to convergent strabismus. We are early taught to comprehend thoroughly and, subsequently, we carefully remember the ætiology of the convergent type as elucidated by Donders and based upon the disproportion existing between accommodation and convergence ; but we are too apt to regard the ætiology of divergent strabismus as simply just the contrary. We forget that, while one muscular anomaly alone, a convergent excess, is causative of convergent strabismus, such is not the case in all instances of the divergent type. It is, I think, on account of a very general lack of recognition of this latter fact that divergent strabismus is regarded by many as so much more difficult to rectify than is convergent strabismus.

If we seek to classify cases of divergent strabismus according to their ætiology, that is to say, according to their accompanying muscular anomaly, we find that they fall, as would naturally be expected, into three distinct groups. First, those accompanied by an insufficiency of convergence ; secondly, those accompanied by a divergence excess ; and, lastly, those presenting both these anomalies in varying proportions. If we attempt to base the classification upon the accompanying refractive error, we again divide the cases into three groups : those in which both eyes are myopic, those in which both eyes are hypermetropic, and those in which one eye is myopic and the other hypermetropic. The second classification is that usually adopted and, from the viewpoint of ætiology and treatment, it is exceedingly unsatisfactory. It takes no cognizance of the fact that any one of three muscular types may be present, usually assumes that all cases of divergent strabmismus are accompanied and caused by a convergence insufficiency, and most frequently predicates one surgical procedure in all instances. On the other hand, a classification based solely upon the existing muscular error, while of much greater service in indicating the operative measures to be employed, is not entirely perfect, inasmuch as the different muscular errors are not *invariably* associated with a constant error of refraction. Its practical value, however, as a guide to treatment cannot be over-estimated, and the fact that in the vast majority of cases there *is* a constant relation between the muscular and refractive errors, constitutes, in my opinion, a strong plea for its adoption. As a very general rule, to which there are few exceptions, insufficiency of convergence is associated with bilateral myopia, divergence excess is associated with bilateral hypermetropia, and a combination of both errors in marked degree is usually found when one eye is hypermetropic and the other myopic. A mild form of either convergence insufficiency or divergence excess may, of course, complicate the predominating muscular error in either hypermetropic or myopic divergent strabismus.

On the basis of the predominating muscular error, we may therefore attempt the classification of divergent strabismus as follows, and in the subjoined table both the muscular anomalies and the refractive errors are arranged in the order of frequency in which they occur, at least in New York City :—

1. Divergence excess : hypermetropia frequent ; myopia rare.
2. Convergence insufficiency : myopia frequent ; hypermetropia rare.
3. Divergence excess (marked) and convergence insufficiency : antimetropia frequent ; bilateral myopia and bilateral hypermetropia less frequent.

By regarding divergent strabismus from this viewpoint, we obtain important indications in regard to operative measures, and can readily determine, as will be shown later, how much or how little benefit is likely to accrue from correction of the refractive error. Some surprise may be expressed that I have rated divergence excess and hypermetropia as the most frequent muscular anomaly and refractive error accompanying divergent strabismus; but such, I am convinced, from the study of a large number of cases, is the position they occupy in New York. In this city divergent strabismus associated with bilateral myopia and convergence insufficiency is comparatively rare. Cases of bilateral myopia exhibiting convergence insufficiency as a latent error (exophoria) are fairly common, but it is only occasionally, and then for the most part when the difference in the refraction of the two eyes is great, that they develop into an actual deviation.

The determination of the muscular anomaly or anomalies existing in any case of divergent strabismus is abundantly simple. In uncomplicated cases of divergence excess, the deviation exists only when the patient gazes at distant objects; or, if it be present, although to a less degree for near points, the power of convergence can be shown to be practically unimpaired by insisting that the patient shall attempt fixation of some test object, such as the point of a lead pencil gradually brought nearer to him in the middle line. In typical cases, which are very frequent, he will maintain bilateral fixation until a point within three or four inches of the root of his nose is reached. Obviously, when this is the case, convergence insufficiency cannot be present. In uncomplicated convergence insufficiency the squint will be more marked for near than for distant objects, one eye diverging more and more as the pencil approaches the face. When both divergence excess and convergence insufficiency are present, the deviation will be marked during both distant and near vision, and the power of convergence will either be entirely absent or will be manifest only to a slight degree. In all pure cases of divergence excess, the extent of the external rotation of each eye will be found to be markedly increased, and not infrequently to comprise an arc of seventy degrees

The nature of the refractive error associated with these muscular anomalies is so nearly constant that we are able with considerable certainty to hazard a guess at the character of the former from observation of the latter. For example, if the converging power is well preserved, if the deviation is present only when the patient gazes at distant objects, and if the power of external rotation is markedly increased, the refractive error is almost certainly bilateral hypermetropia. If, on the other hand, the converging power is markedly diminished or absent, and the squint is absent or slight for distant objects, bilateral myopia very generally co-exists. Cases in which the deviation is marked for distant objects, and in which there is but little or no power of convergence are very generally those in which one eye is myopic, and the other hypermetropic at least in one meridian; or, if bilateral myopia should be present, the disproportion in the refractive error of the two eyes will be great. These rules have some exceptions, but they are few in number. I have encountered within the past two years a couple of cases in which bilateral myopia existed, and in which an almost pure divergence excess was the associated muscular anomaly. In each case bilateral fixation was secured by a free tenotomy of the externi. It must also be admitted that convergence insufficiency may occasionally be the predominating muscular error when bilateral hypermetropia exists, although such an association is exceedingly rare. In the vast majority of cases, the above table represents the relative frequency of the muscular and refractive errors according to my experience with divergent strabismus in New York City.

In the treatment of divergent strabismus, it is generally held that our first endeavour should be to correct the refractive error, and that, after such correction, a cure may result without resort to operative measures. A cure may thus be obtained, but only in those cases in which myopia fairly equal in degree is present in both eyes, and in which convergence insufficiency is the sole, or greatly predominating, muscular anomaly. Correction of the refraction produces no effect when the deviation is due to a divergence excess. It follows, then, that most cases of divergent strabismus necessitate operative measures for their cure, and the results are, generally speaking, exceedingly satisfactory and frequently perfect, if we are guided in our choice of operation by the muscular anomaly present. The surgeon who makes it his practice to employ in all cases the same operative procedure, advancement of the interni, tenotomy of the externi, or advancement of the internus and tenotomy of the externus of the squinting eye, is certain to meet with a greater number of failures than he who varies his method to accord with the muscular error he is called upon to attack. The cases most frequently encountered in New York (and in London ?) are those of bilateral hypermetropia associated with divergence excess. In these, advancement of both interni will result in failure. The proper procedure consists in a *free* tenotomy of both externi, repeated if necessary, and this is no less true when, as is rarely the case, the divergence excess is accompanied by bilateral myopia. In the hypermetropic cases, even if a fairly well-marked convergence insufficiency co-exist, the tenotomies should constitute the primary measure and should be persisted in until the deviation is corrected for distant vision. When bilateral fixation for distant objects has been thus obtained, it will not infrequently be found that the power of convergence has returned to normal and that further interference will be unnecessary. Cases of myopia associated with convergence insufficiency, in which the deviation persists after full correction of the refractive error, require the advancement of one, or more generally of both, interni, and, in no circumstances, should tenotomy of the externi be performed in pure cases of this type. When both divergence excess and convergence insufficiency in marked degree are associated, the predominating muscular error, which, except in cases of bilateral myopia, is usually the divergence excess, should be first attacked by means of free tenotomies of the externi.

A CLINICAL STUDY OF FIFTY-FIVE CASES OF INTRA-OCULAR RETENTION OF FOREIGN BODIES, WITH RESULTS TWO YEARS AFTERWARDS.

(*Continued.*)

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Description of Cases.

I will now give a short description of the fifty-five cases classified under the following headings:

(i) Number of the case.

(ii) The eye affected. It is generally stated that in this class of injury, the left eye is more frequently affected than the right. In these cases the left eye was injured in 29 cases, and the right in 26. I think the eye which is injured, depends a good deal on the occupation of the worker. For example, a hammerman, who is striking at something in front of him, and swinging the hammer from right to left, will, of course, expose the left side of his face to injury more than the right.

(iii) The position and character of the wound. This must be looked at along with number (VIII), that is, the position of the foreign body, to get a proper idea of the prognosis and treatment, as I have indicated under this heading. In the position of the wound, I have indicated special features where they have presented themselves as indicative of the presence of a foreign body in the eye, such as the small linear streak of Descemet's membrane and the direction of the ciliary body or scleral wound, equatorial, oblique, etc.

(iv) Other complications, and the special points under naked-eye and ophthalmoscopic diagnosis. Like the preceding (number III), I have picked out the special points suggesting the presence of a foreign body in the eye, such as the "hole in the iris," the "vitreous track," the penetrating wound of the lid, and also indicated the prognosis, for example, where the tension is much lowered, or where irido-cyclitis is present when the patient first presents himself.

(v) The visual acuity of the injured and uninjured eye. In every case the visual acuity of the sound eye was taken, along with the visual acuity of the injured eye. This, again, is useful, as indicated elsewhere, in studying the subsequent progress of the injured eye, and also the falling off of the visual acuity of the good eye when sympathetic ophthalmitis develops, besides being a good guide in the after-examination of the case with regard to the Workmen's Compensation Act.

(vi) The interval between date of injury and the patient first presenting himself. This, of course, influences the prognosis, as indicated elsewhere.

(vii) The X-ray plate.

(viii) Position of the foreign body. Where no plate was taken, and where the plate was negative, such is indicated.

(ix) Magnet and other operations and subsequent complications. In magnet operations I have indicated the different measures which were adopted, such as I have advocated under the heading of "Treatment by the Magnet." Where another method was adopted, the reason for doing so is indicated.

(x) Results two years afterwards. Unless otherwise indicated, such as at the latter end of the series, these cases were examined either by myself over two years from the date of injury, or I had the Hospital record of the case to the date when the patient did not turn up after receiving the post-card, or had changed his address.

I have numbered these different headings in the way that one would go about examining a case—that is, a naked-eye examination, taking of the visual acuity and history, the X-ray plate, and the operation by the magnet :

I.	Number of case	1.
II.	[illegible]	[illegible]
III.	Position and character of the wound	Small central perforated corneal wound.
IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Lens cataractous Foreign body noticed in upper part of lens by ophthalmoscope. Tension +.

V. Visual acuity of injured and uninjured eye	Left : counts fingers. Right : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Four days.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	In lens.
IX. Magnet and other operations, and subsequent complications	No response to giant magnet outside. Keratome incision above and lens matter drawn off. Iridectomy above and insertion of sharp curved point of magnet. Engaged small chunk of metal (3 mm. × 2 mm.) Two months later, needling of secondary matter.
X Results two years afterwards	Visual acuity left : + 10 D. sph. $\frac{6}{24}$. Visual acuity : right, $\frac{6}{6}$. Saved.

I. Number of case	2.
II. Eye affected	Left.
III. Position and character of the wound	Small corneal vesicle in outer-inferior quadrant.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Under homatropine, small localized cataract at a point behind corneal wound. Pupil dilates well, except at a point behind wound, where there is a dimple in the middle of the iris. Tract of opacity through lens, and, by ophthalmoscope, small foreign body lodged in fundus below and at outer side of disc.
V. Visual acuity of injured and uninjured eye	Left : $\frac{6}{36}$. Right : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Fourteen days.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	In globe at back of eye.
IX. Magnet and other operations, and subsequent complications	Copper. Electro-magnet negative at all points outside. Scleral puncture down and out, and insertion of sharp point of magnet produced no result.
X. Results two years afterwards	Visual acuity, left $\frac{6}{36}$. Localized cataract not progressed. Foreign body I.S.Q. copper. Visual acuity, right : $\frac{6}{6}$. Saved.

I. Number of case	3.
II. Eye affected	Left.
III. Position and character of the wound	Small central corneal puncture at upper part.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Slight hyphæma. Opacity of lens above and to inner side. Tenderness above inner canthus.
V. Visual acuity of injured and uninjured eye	Left : counts fingers at one foot. Right : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Outside eyeball. In orbit above inner canthus.

IX. Magnet and other operations, and subsequent complications	Electro-magnet, no result. Two months later, a small point of suppuration appeared above inner canthus ; this broke and small scale of metal came away.
X Results two years afterwards	Visual acuity left : counts fingers. (Cataract not removed). Visual acuity right : $\frac{6}{6}$. Saved.

I. Number of case	4.
II. Eye affected	Left.
III. Position and character of the wound	Large equatorial ciliary wound involving sclera and cornea at nasal side.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Prolapse of iris, choroid, and vitreous. Soft and disorganized eyeball.
V. Visual acuity of injured and uninjured eye	Left : perception of light. Right [illegible]
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous.
IX. Magnet and other operations, and subsequent complications	Electro-magnet under chloroform anæsthesia. Large chunk (13 mm × 4 mm × [illegible] removed through original wound. Enucleation immediately after extraction of metal.
X. Results two years afterwards	Visual acuity right : $\frac{6}{6}$. Lost.

I. Number of case	5.
II. Eye affected	Left.
III. Position and character of the wound	Large oblique ciliary wound involving sclera and cornea.
IV Other complications and special points on naked eye and ophthalmoscopic diagnosis	Prolapse of iris and loss of vitreous. Soft and disorganized eyeball.
V Visual acuity of injured and uninjured eye	Left : perception of light. [illegible]
VI Time intervening between date of injury and patient first presenting himself	Same day.
VII X-ray plate...	Positive.
VIII Position of foreign body ...	Vitreous.
IX Magnet and other operations, and subsequent complications	Electro-magnet under chloroform anaesthesia. Large chunk (15 mm. × 4 mm. × 3 mm.) removed through original [illegible] Enucleation immediately after extraction of metal.
X Results two years afterwards	Visual acuity right : $\frac{6}{9}$, hypermetropic astig Visual field for white, red, and blue evidently slightly contracted. [illegible] No discomfort. Lost.

I Number of case	6.
II [illegible]	[illegible]
III [illegible] the wound	[illegible]

IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Penetrating wound of lid. Escape of vitreous. Tension —. Bloodclot in vitreous.
V. Visual acuity of injured and uninjured eye	Right : perception of light. Left : $\frac{6}{24}$ hypermetropic astig.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Attempt to draw into anterior chamber unsuccessful. Large scale (8 mm. × 4 mm.) extracted through original wound. Conjunctiva sutured over wound.
X. Results two years afterwards	Right : hand movements. Detachment of retina beneath site of original wound. Enucleation advised, as pain at times. Left ; $\frac{6}{24}$ hypermetropic astig. Saved.

I. Number of case	7.
II. Eye affected	Right.
III. Position and character of the wound	Small penetrating puncture at lower part of cornea.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Anterior chamber full. Spicule noticed embedded in iris, with point in lens.
V. Visual acuity of injured and uninjured eye	Right : $\frac{6}{24}$ } myopic astig. Left : $\frac{6}{24}$ }
VI. Time intervening between date of injury and patient first presenting himself	One day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Iris and lens.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. No result externally. Limbal section below at site of foreign body. Point of magnet inserted and spicule (2 mm. × 3 mm.) extracted with difficulty, as engaged in lens. Prolapse of iris replaced.
X. Results two years afterwards	Right : $\frac{6}{24}$. Localized cataract not progressed. Left $\frac{6}{24}$ Saved.

I. Number of case	8.
II. Eye affected	Right.
III. Position and character of the wound	Oblique ciliary wound involving sclera and cornea.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Hyphæma. Iris prolapsed.
V. Visual acuity of injured and uninjured eye	Right : perception of light. Left : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous.

IX. Magnet and other operations, and subsequent complications	Electro-magnet. Scale (2 mm. × 3 mm.) drawn into anterior chamber and extracted. Prolapsed iris excised. Patient refused to remain in Hospital after extraction of metal.
X. Results two years afterwards	Right : nil. Phthisis bulbi. Refused enucleation. Left [illegible] —looks well, and no irritation. Visual field normal. Lost.

I. Number of case	9
II. Eye affected	Left.
III. Position and character of the wound	Small healed corneal scar at upper part.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Metal noticed in iris and lens Lens cataractous
V. Visual acuity of injured and uninjured eye	Left : counts fingers. Right : $\frac{6}{6}$.
VI Time intervening between date of injury and patient first presenting himself	Four days.
VII X-ray plate...	No plate.
VIII Position of foreign body ...	Lens.
IX. Magnet and other operations, and subsequent complications	Corneal section above, with iridectomy. Extraction of scale (2 mm × [illegible] mm) Ten days later, lens matter drawn off.
X. Results two years afterwards	Left : + 12D. sph. $\frac{6}{36}$. Right : $\frac{6}{6}$. Saved.

I. Number of case	10.
II. Eye affected	Left.
III. Position and character of the wound	Large oblique scleral wound at nasal side, near limbus
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	[illegible] Prolapse of iris. Blood clot in vitreous Tension —.
V. Visual acuity of injured and uninjured eye	Left : perception of light. Right : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	No plate
VIII. Position of foreign body ...	Vitreous.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. [illegible] chamber Large chunk (10 mm. × 5 mm. × 2 mm.) extracted through original wound. Enucleation a week after. Plastic iridocyclitis.
X. [illegible] afterwards	[illegible] [illegible]

I. [illegible]	[illegible]
II. [illegible]	[illegible]
III. Position and character of the wound	[illegible] outer and inferior quadrant.

IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Anterior chamber full. Small black object (? foreign body) in iris behind wound.
V. Visual acuity of injured and uninjured eye	Right : $\frac{6}{12}$. Left : $\frac{6}{12}$ old iritis.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Negative.
VIII. Position of foreign body ...	Iris.
IX. Magnet and other operations, and subsequent complications	Corneal section near foreign body and extraction of very small spicule ($\frac{1}{2}$ mm.) by small magnet.
X. Results two years afterwards	Right : $\frac{6}{12}$. Left : $\frac{6}{12}$. Saved.

I. Number of case	12.
II. Eye affected	Left.
III. Position and character of the wound	Oblique ciliary wound involving sclera and cornea.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Iris engaged in wound.
V. Visual acuity of injured and uninjured eye .	Left : perception of light. Right : $\frac{6}{18}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Behind globe.
IX. Magnet and other operations, and subsequent complications	Electro-magnet tried externally on day of injury and following day. No result. Hypopyon. Then scleral puncture done—only an indefinite dragging pain. Seven days later—enucleation. Plastic iridocyclitis. Thick scale (4 mm. × 2 mm. × 1 mm.) in mass of fibrous material adhering to sclera behind macula.
X. Results two years afterwards	Right : $\frac{6}{18}$. Lost.

I. Number of case	13.
II. Eye affected	Left.
III. Position and character of the wound	Small perforating scleral wound—nasal side
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Vitreous a little hazy, but definite disturbance of the choroidal pigment in retina at bifurcation of inferior temporal vein.
V. Visual acuity of injured and uninjured eye	Left : $\frac{6}{9}$. Right : $\frac{6}{9}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Behind eyeball.

IX. Magnet and other operations, and subsequent complications	Negative to electro-magnet on several occasions. Only a little dragging pain.
X. Results two years afterwards	Visual acuity left: $\frac{6}{9}$. Visual acuity right: $\frac{6}{9}$. Disturbance of pigment now suggests a "hole" in globe. Saved.

I. Number of case	14.
II. Eye affected	Left.
III. Position and character of the wound	Large vertical gaping ciliary wound, involving cornea and sclera.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Lid split in front of wound Large escape of vitreous. Prolapse of iris Disorganized eyeball.
V. Visual acuity of injured and uninjured eye	Left: nil. Right
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	In vitreous immediately behind wound.
IX. Magnet and other operations, and subsequent complications	Electro-magnet, under chloroform anaesthesia. Large scale (12 mm. × 8 mm. × $\frac{1}{2}$ mm.) extracted through original wound. Enucleation immediately after extraction of metal Lid stitched.
X. Results two years afterwards	Visual acuity right: $\frac{6}{6}$. Lost.

I. Number of case	15.
II. Eye affected	Left.
III. Position and character of the wound	Large meridional ciliary-corneal wound at lower part
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Anterior chamber empty. [illegible] Foreign body noticed penetrating iris and lens
V. Visual acuity of injured and uninjured eye	Left: counts fingers. Right: $\frac{6}{36}$ hypermetropic astig.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive
VIII. Position of foreign body ...	In lens.
IX. Magnet and other operations, and subsequent complications	[illegible] through original wound 14 days later, lens matter drawn off [illegible] 6 months after injury, secondary matter again needled
X. Results two years afterwards	[illegible] vision [illegible] [illegible]

I. Number of case	16.
II. [illegible]	Right.
III. Position and character of the wound	Small healed linear corneal wound at nasal side in horizontal meridian, with white streak in Descemet's membrane

IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Hypopyon, 1 mm. Lens opacity behind wound. Iris fixed and muddy.
V.	Visual acuity of injured and uninjured eye	Right : perception of light. Left : [illegible].
VI.	Time intervening between date of injury and patient first presenting himself	3 days.
VII.	X-ray plate...	Positive.
VIII.	Position of foreign body ...	Behind eyeball.
IX.	Magnet and other operations, and subsequent complications	Electro-magnet, externally, on first and second day after admission. No result except dragging pain. On second day sclerotomy produced no result. Enucleation four days after. Plastic iridocyclitis. Hypopyon.
X.	Results two years afterwards	Left : (?) $\frac{6}{6}$. No complaint. Lost.

I.	Number of case	17.
II.	Eye affected	Left.
III.	Position and character of the wound	Character of wound, same as case No. 16, except the edges are pouting. Near limbus at temporal side.
IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	" Hole " in iris. Blood clot in vitreous. Air bubbles in vitreous.
V.	Visual acuity of injured and uninjured eye	Left : counts fingers. Right [illegible].
VI.	Time intervening between date of injury and patient first presenting himself	Same day.
VII	X-ray plate...	Positive.
VIII.	Position of foreign body ...	Behind eyeball
IX	Magnet and other operations, and subsequent complications	Electro-magnet, outside. Only dragging pain. Electro-magnet through sclerotomy wound—no result. Enucleated five days after injury. Plastic iridocyclitis. Hypopyon.
X.	Results two years afterwards	Right [illegible]. No complaint. Lost.

I.	Number of case	18.
II.	Eye affected	Left.
III.	Position and character of the wound	Large lacerated oblique ciliary corneo-scleral wound—nasal side.
IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Total hyphæma. Prolapse of iris. Tension —.
V.	Visual acuity of injured and uninjured eye	Left : perception of light. Right : $\frac{6}{9}$.
VI.	Time intervening between date of injury and patient first presenting himself	Two days.
VII.	X-ray plate...	Positive.
VIII.	Position of foreign body ...	Vitreous.

IX.	Magnet and other operations, and subsequent complications	Large chunk (8 mm. × 5 mm. × 2 mm.) extracted from corneal wound by anterior chamber route. Prolapse excised. Enucleated 12 days after. Iridocyclitis.
X.	Results two years afterwards	Right [illegible] No discomfort. Lost
I.	Number of case	19.
II.	Eye affected	Left.
III.	Position and character of the wound	Small scleral wound behind and to nasal side.
IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Split wound of lower lid. Vitreous escaping. Tension —. Conjunctival ecchymosis. Blood clot in vitreous.
V.	Visual acuity of injured and uninjured eye	Left: counts fingers. Right [illegible]
VI.	Time intervening between date of injury and patient first presenting himself	Same day.
VII.	X-ray plate...	Positive.
VIII.	Position of foreign body ...	Vitreous.
IX.	Magnet and other operations, and subsequent complications	Refused to stay in hospital. 3 days later admitted. Electro-magnet. Piece of metal drawn into anterior chamber round nasal side of lens. Keratomy, and extracted. Iris prolapse excised. Chunk 8 mm. × 4 mm. × 2 mm Enucleated 35 days after injury. Soft, sightless, and painful eyeball.
X.	Results two years afterwards	Right: $\frac{6}{6}$, no complaint. Lost.
I.	Number of case	20.
II.	Eye affected	Left.
III.	Position and character of the wound	Small (2 mm.) perforating corneal wound. Central linear streak of Descemet's membrane.
IV	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Lens cataractous. Point of rupture in anterior capsule made out.
V	Visual acuity of injured and uninjured eye	Left: counts fingers. [illegible]
VI	Time intervening between date of injury and patient first presenting himself	Same day
VII	X-ray plate...	Positive.
VIII	Position of foreign body ...	Vitreous—posterior part.
IX.	Magnet and other operations, and subsequent complications	Electro-magnet. Small scale appeared in anterior chamber. No pain experienced by patient. [illegible] point of magnet through small original corneal wound 4 days later, soft lens matter drawn off.
X.	Results two years afterwards	[illegible]
I	Number of case	[illegible]
II	Eye affected	[illegible]
III.	Position and character of the wound	Small (2 mm.) perforating wound of cornea, central

IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Under atropine, pupil dilates irregularly, showing posterior synechiæ.
V. Visual acuity of injured and uninjured eye	Left: counts fingers. Right : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	3 days.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Posterior part of vitreous.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Small spicule (2 mm. × 1 mm.) drawn through the iris at 4 o'clock, leaving a hole in the iris. Extracted through original wound by insertion of magnet point.
X. Results two years afterwards	Left : counting fingers. Vitreous opacities Partially occluded pupil. Right : No complaint Saved.

(To be continued.)

CLINICAL MEMORANDUM.

CONJUNCTIVAL FLAPS IN CATARACT EXTRACTION.

BY

HAROLD B. GRIMSDALE, M.B., F.R.C.S.,

LONDON, ENGLAND.

IN the March OPHTHALMOSCOPE Colonel H. Smith brings several allegations against conjunctival flaps.

A good many of these points are difficult of discussion, but the first and second relate to matters of fact which should be verifiable without much difficulty.

As to the first objection, namely, that the time spent on the operation is quadrupled, I have for some years made a practice of cutting a conjunctival flap in all cataract operations from within outwards without any ballooning of the conjunctiva by subconjunctival injection.

I find this makes no appreciable difference in time; nor do I find that the flap interferes seriously with the after-manipulations. The whole operation from start to finish, I find, takes me six or seven minutes, including the application of the bandage.

As to the second objection raised by Colonel Smith, namely, that the amount of astigmatism in the case of conjunctival flaps is often very marked, that has not been my experience. I have looked up the last twenty cases without selection, and have found that in one case there was chosen a cylinder of 4·0 D., in one 3·0 D., in one 2·50 D., in six 2·0 D., in one 1·5 D., in four 1·0 D., in five no cylinder, and in one — 1·0 D. cyl. horiz.

The average cylindrical correction, therefore, is about 1·25 cyl. D. axis horizontal.

In one case the lens was extracted intracapsularly by the vectis, because it was tremulous; but the operation was not made more difficult by the presence of the flap.

On the other hand, I am convinced that the average stay in hospital is less since I adopted the routine use of the conjunctival flap, although I am unable to attribute this entirely to the flap, as at the same time, or thereabout, I made two other modifications in *technique* which have no doubt played a part.

TRANSLATION.

REMARKS ON A CASE OF INFECTIVE PHLEGMON OF THE ORBIT CURED BY PARASPECIFIC TREATMENT.*

BY

DR. A. DUTOIT,

OF MONTREUX, SWITZERLAND.

NOT only is the case reported by Dutoit a very remarkable one, but the explanation offered by the author of the *modus operandi* of paraspecific therapy is so simple that we think it right to place it before our readers almost in its entirety, along with an abstract of the case.

"Therapeutic experiment has already proved in many circumstances that, besides their absolutely specific immunizing action, antitoxic and antimicrobic sera have an attenuating power, often quite marked, on infections other than those against which they have been prepared; one might perhaps say against infections of a lesser degree of toxicity.

"In any case, the action of this heterovalent, heterodox, or paraspecific serotherapy might be theoretically explained in the following way:

"When a fresh and healthy animal is actively immunized against such a violent toxin as, for example, diphtheria toxin or tetanus toxin, all its anatomical elements, cellular and fluid, become immediately prepared for defence, and pour in abundance into the blood-stream, each in accordance with its powers, antibodies, antitoxins, immunizing bodies, bacteriolysins, and other elements for defence, of which unfortunately we do not know all. The glandular tissues, the nervous centres, bone marrow, and muscles become functionally hyper-active, and we can easily understand that the serum of such an animal may be rich in hormones, ferments, and diastases, of every kind, which, when injected into an individual suffering from any infective malady, will assist that individual to battle with this malady and overcome it, without there being any real question of specific antitoxic action.

"Without going further into details of this interesting subject, we hasten to add that the lymphocytosis awakened by every microbic infection is capable alone of giving a plausible explanation of the facts.

"This brings us to the discussion of certain products which do not belong to the serum and are indeed not of animal origin at all, comprising, it may be, organic substances of the highest activating value, which, precisely because they excite lymphocytosis, deserve as much attention as specific sera properly so-called. These living and vivifying products of ferment nature we know physiologically as diastases or oxydases. They have long been employed therapeutically, for preference by the mouth, a fact which proves their harmlessness. All the observations which, in the course of a paraspecific treatment

* [illegible]

of this kind have seemed to point to ill-effects, ought to be placed to the account of a product which has not been well prepared or which is indeterminate in composition.

"We can thus venture to conclude that every carefully and scientifically made product presents guarantees such as our clinical experience demands, guarantees which make sure of the multiple results which we know to depend on lymphocytosis; antibodies, bacteriolysins, and so forth. Therefore we confidently decided to make a trial of 'novitase' (manufactured by Société anonyme Novitase, Geneva)."

(The author makes some remarks at this point regarding experiments on Novitase and its use in infective diseases like pneumonia, influenza, etc., but of the nature of the substance he says nothing at all beyond what he has already said about ferments).

The case was that of a girl, aged 12 years, who had fallen ill suddenly, two days previously, with pain and fever. The left half of the face was swollen, the swelling being localised about the orbit and cheek. It gave the impression of a firm and deep œdema. There was tenderness all round the orbit. The eyelids, which were swollen and discoloured as by a hæmorrhage, completely covered the eye, which was itself proptosed. On separating the lids, there was seen to be palpebral and bulbar chemosis, but the cornea was clear. The pupil reacted promptly, and the media and fundus were normal. The eye was sensitive to the least touch or pressure backward. There was general prostration, anorexia, and a temperature of 40·2 degrees C. The tongue was dry and brown, and the abdomen retracted (*creux*). Tremor of hands.

The patient was ordered to take a table spoonful (*cuillerée à soupe*) of novitase every hour. Locally, merely warm boric compresses. On the following day, and indeed from the absorption of the third spoonful of novitase, improvement was very marked, and the temperature had fallen to 38·2 degrees. By the third day the contents of the whole bottle, containing about 250 grammes, had been consumed. On this day there was neither fever, œdema, exophthalmos, or pain on pressure. The child was able to sit up and to eat rice and to drink milk. After forty-eight hours, where there had been a raging infection, there was now nothing to be seen but a bluish circle round the eye, as if from a blow with a fist.

Concerning this case, the author makes the following concluding remarks.—"We publish this observation for what it is worth. Its value would be *nil*, were it not for the confirmation it affords of many facts, observed by many authors, as following the therapeutic measures so wisely called 'paraspecific' by Darier; a therapeusis which is only a more scientific application of ancient medical practice, the effect of which consisted, above all, in a stimulation of lymphocytosis and phagocytosis. Novitase, or Tapo (another name for novitase) would act in this manner as the following work tends to prove."

ERNEST THOMSON.

(The work just referred to by the author is an article on "Leucocytosis," by Bérard, of which an abstract is given in this number of THE OPHTHALMOSCOPE, see p. 282.)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

OPERATIONS.

9.—Glaucoma.

(1) Lundsgaard, K.—Experiences with Elliot's operation in glaucoma. (Erfahrungen über Elliot's Operation bei Glaukom.) *Klin. Monatsbl. f. Augenheilkunde*, Feb-March, 1915.

(2) Bulson, Albert E., Jun.—The diagnosis and treatment of simple glaucoma. *Journal of the Indiana State Medical Association*, April, 1915.

(3) Vail, Derrick T.—Retained silk thread, or "seton" drainage, from the vitreous chamber to Tenon's lymph channel, for the relief of glaucoma. *Ophthalmic Record*, April, 1915.

(4) Wood, Casey A.—Aqueoplasty; or, the Zorab operation for glaucoma. *Ophthalmic Record*, April, 1915.

(5) Wilmer, W. H.—Sclero-corneal trephining in glaucoma. *Southern Medical Journal*, May, 1915.

(6) Wood, Casey A.—The sclero-corneal seton in the treatment of glaucoma. *Ophthalmic Record*, May, 1915.

(7) Hallett, De Wayne.—Corneo-scleral trephine after the Elliot method for the reduction of intra-ocular tension. *Jour. Ophth., Otol., and Laryngol.*, June, 1915, p. 478.

(8) McHenry, D. D.—Report of cases. Elliot's sclero-corneal trephining. *South-West Journal of Medicine and Surgery*, U.S.A., Vol. XXIII, p. 184, 1915.

(9) Kraupa, Ernst.—Elliot's trephining and Heine's cyclodialysis. (Elliot und Zyklodialyse.) *Centralbl. f. prak. Augenheilkunde*, September-October, 1915.

(10) Harrower, David.—A report of several cases of chronic simple glaucoma treated by iridotasis. *Trans. American Ophth. Society*, Vol. XIV, Part i, 1915, p. 55.

(11) Wheelock, K. K.—Corneoscleral subconjunctival seton in glaucoma simplex. *Ophthalmic Record*, February, 1916.

(12) Roy, Dunbar.—Some observations on the operation of iridotasis for glaucoma. *Ophthalmic Record*, March, 1916.

(1) Lundsgaard, of Copenhagen, points out that there was, until recently, a growing tendency to believe that high ocular tension could not be satisfactorily reduced without operation, and that in any case operation was preferable to the continued use of miotics. This belief and the consequent practice were much encouraged by the introduction of Elliot's operation and the employment of the Schiötz tonometer. But further experience demands a reconsideration of the position. The risks of operation are found to be greater than they were supposed to be, and since, in the author's experience, tension as high as 35 mm. Hg. may undergo spontaneous reduction, or may persist for years without deterioration of vision, it is not correct to look upon every case of high tension as one demanding operation.

After describing the *technique* followed by him in doing Elliot's operation (which is practically that of the originator, with slight modifications in the instruments), he tabulates the results of forty operations after intervals of not less than six months. He obtained a satisfactory result (reduction of pressure and no complications) in 28 eyes, and in almost all these cases the V.A. and field of vision were maintained or improved. His statistics favour the performance of iridectomy, in addition to the trephining. He had two cases of late infection, in one of which the result was disastrous. That this is a very real risk is shown, he says, by the number of cases now published.

In the opinion of the author, Elliot's operation is a very valuable addition to glaucoma therapy. It is fairly certain in its results, and easy to perform ; but it involves real and serious risks, and he does not now feel inclined to operate in every eye with high tension, nor does he employ the operation for prophylactic reasons. Since he has seen spontaneous reduction of high tension, he would in cases of tension up to 35 mm. Hg., but without symptoms, wait for a while without operating. Where miotics have no affect and operation seems called for, he is not deterred by reduction of the V.A. and fields. A. J. BALLANTYNE.

(2) **Bulson,** of Fort Wayne, discusses the diagnosis and treatment of glaucoma. He thinks that too often the condition is not diagnosed owing to imperfect examination of the patient, and he impresses on his readers the importance of careful ophthalmoscopy, perimetry, and tonometry. He quotes de Schweinitz as saying that "palpation possesses only an historic interest in comparison with the tonometer for estimating tension." This is a view that is rapidly gaining ground the world over, but we fear that it still needs to be impressed on some ophthalmologists. He is in favour of always employing miotic treatment in the first instance. As to operating, he says : "The trephine operation is to be preferred, and probably the best results will be obtained by closely following the *technique* laid down by Elliot." His own results have been "highly satisfactory and though sufficient time has not yet elapsed to show what the ultimate outcome will be, several cases have shown for months a relatively normal tension as determined by the tonometer, and by retention of the sight, and fields of vision, possessed at the time of operation." He adds the rider that "The success of the trephine operation depends almost entirely upon a reasonably faultless *technique*." Possibly, he has here put his finger on the cause of the extraordinary discrepancy in the results of different operators.

Discussion.

The reading of Bulson's paper led to a very interesting discussion before the Indiana State Medical Association, at Lafayette, September 24th, 1914. The proceedings appear in *The Journal of the Indiana State Medical Association*, April, 1915.

D. W. Stevenson, of Richmond, laid stress on the mental condition of many glaucoma patients, and on the need for regulation of their habits, and especially of their diet. He has done about eight trephine operations ; has had some excellent results with it ; and looks upon it "as the most promising operation we have." He considers that a patient with simple glaucoma should be seen for the rest of his life at comparatively short intervals, with a view to his health being looked after carefully. It is well known that Elliot's contention has long been that once these cases are successfully operated on, they are delivered from the burden of constant medical attendance. This, we believe, is also the view held by a large number of the leading ophthalmologists.

L. D. Brose, of Evansville, believes that in simple, as in congestive, glaucoma we get an increase of tension, which "may occur irregularly, and not remain constant." On the other hand, he maintains that "augmented tension and glaucoma are by no means identical conditions"; in support of this view he cites the case of the increased tension that accompanied severe iritis. He impressed a very important point on the meeting, *viz.*, the necessity of relying on no single test alone, but of looking at the case in all its bearings, and for undertaking prolonged and continuous observation if necessary. Every source of auto-infection should be eliminated, the patient's habits and life should be carefully regulated; if all this fails, we must then proceed to operation. He spoke of the difficulties and dangers of iridectomy, even in the hands of very eminent American and European ophthalmic surgeons, and added "I know that Colonel Elliot considers his operation easier of performance than simple iridectomy, but some of us, at least, who have seen him operate and trephine, can bear witness that it has required more time and delicate work than is the rule for simple iridectomy."

F. C. Heath, of Indianapolis, considers that the tonometer solves the difficulty of diagnosis completely in many doubtful cases. In connection with the question of attending to elimination, he attached some value to the exhibition of salicylates. He said "as regards operative treatment, while iridectomy has served us well in acute glaucoma, we have all been disappointed with its effects in chronic glaucoma," and added that he had been converted to the employment of the trephine in the latter class of cases.

W. A. Hollis, of Hartford City, had used citrate of soda injections subconjunctivally, in conjunction with miotics, and had been pleased with the result.

T. C. Hood, of Indianapolis, said that English ophthalmologists had taken up trephining very conservatively, and do not like it much. Some of them fear the hypotension and late infection. His own experience had been a very happy one in the two cases he had trephined: the central visual acuity, and the fields of vision had been improved, and the tension had been lowered.

McReynolds, of Dallas, said that the altered composition of the aqueous found after a filtration operation "offers an ideal condition to promote the development of iritis"; furthermore, he considered that it strongly favours the incidence of late infections. His line of reasoning was as follows.—If you make an incision into the eye, the aqueous becomes more or less albuminous, "and if this is kept up continuously, as after an Elliot trephining, the aqueous takes on a distinctly albuminous character . . . . You find the wound bathed in more or less albuminous fluid, which offers an idea condition to promote the development of iritis.* .

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* Col. R. H. Elliot, in response to an invitation, makes the following criticisms on McReynolds' [illegible] anterior chamber after an Elliot, or other filtration operation, is more albuminous than normal. It by no means follows that what happens in a freshly opened eye, whose fluid is freely draining away, happens in the conditions established by a successful sclerostomy. Indeed, it is probable that once the comparatively slow flow through the eye is re-established, as we believe it is shortly after operation, the fluid rapidly assumes its normal composition. We must certainly not accept McReynolds' premises without the results of carefully conducted experiments to support them, even when we are considering the conditions in being within a few days or even hours after operation. When we come to think what the position is weeks and months, or even years, afterwards, and this is what we must do in facing the question of late infections, we should be rash indeed to assume an increased albumen-content of the chamber fluid. In my judgment, it is very unlikely indeed that such a change in composition is in existence. McReynolds' suggestion that thin flaps favour late infection would appear to have the weight of modern opinion with them.

Nor am I aware of the authority for the dogmatic statement that the altered condition, which McReynolds assumed to exist, would, as he supposes, provide ideal conditions either for early iritis [illegible] insufficient data.—EDITOR.

Lichtenberg, of Kansas City, has had an experience of fifteen cases of trephining, and with the exception of his first, which was done on a blind eye, for the purpose of learning how to do it, he had had good results; he had had no infections, and had seen little of iritis. He thought a complete iridectomy should be done in every case. He laid stress on wide flaps, on strict antisepsis, on splitting the cornea well, and on looking out in advance for, and on dealing with if necessary, all possible foci of auto-intoxication.

Bulson, in closing the discussion, said that nearly all those who have reported good results from sodium citrate treatment, had also employed miotics; he could get the same results with the miotic alone; every case of glaucoma was likely to come to the operating table some time, and he objected to any form of treatment that was calculated to interfere with the making of the large loose flap required for trephining. In his opinion, "the subconjunctival treatment is more or less discredited by practically all the leading clinicians to-day." He believes that in simple glaucoma, the increased tension is persistent; this, he thinks, is the cardinal difference between simple and other forms of glaucoma. There can be little question, however, that many will take exception to this latter statement of opinion. He concluded by saying "Concerning the trephine operation and the objections that have been raised, I would say that the operation has been tested repeatedly and found very efficient. We must not lose sight of the fact that the patient has a disease that is going to end in blindness. We know that there are certain risks attending the trephine operation; but the risks are not one-tenth of those attending iridectomy, and if you are not holding the vision, in spite of using eserine, why bring up a few minor objections regarding the trephine operation? It is not a difficult operation to perform. Nearly every man, who has made objections to the Elliot operation, has not followed the Elliot *technique* exactly, but has attempted to better it. They have no right to criticise Elliot when they have done only a few operations as compared with the thousands done by Elliot. In this country a great many trephine operations have been done—more since Elliot's visit. The majority of the operators are quite satisfied with the operation and its results. I think the secret of success is in dissecting the conjunctival flap very much as Elliot does, and then making the opening partly in corneal tissue, and partly in scleral tissue, after the cornea has been 'split,' as he terms it. I think much of the success depends on that point." He has tried both the 2 mm. and the 1·5 mm. trephine, and evidently is inclined to favour the latter; he has not been troubled with hypotonus in his results.

A very interesting feature in the above discussion is undoubtedly the stress laid on the management of the patient's health; it is a mark of a rising tide of feeling throughout the world. Ophthalmologists are learning to detach themselves from the habit of allowing the rise in ocular tension to absorb all their thoughts, and are adopting more and more the attitude called for by Lagrange's aphorism: that a glaucomatous eye is "a sick eye in a sick body." With regard to the attitude of English surgeons, we think that T. C. Hood has been somewhat misled. A very large number of ophthalmic surgeons, both in London and in the provinces, are doing the Elliot operation, or some modification of it, which differs from the original only in minor details. C. P.

(3) **Vail,** of Cincinnati, describes a procedure which he successfully adopted in 1907 for the relief of tension in absolute glaucoma. It consisted in the introduction and retention of a seton between Tenon's space and the vitreous. A full-curved, sharp, short, and broad needle, armed with No. 10

black silk plaited thread of the "whipcord" order, was passed through the conjunctiva, in the equatorial region of the eyeball, in the lower-outer aspect of the globe, made to pass a short distance (about 10 mm.) under the episcleral tissues, then boldly through the sclera in the region of the ora serrata, through choroid and retina, well into the vitreous, and out through the same structures again, about 8 mm. from the point of entrance. The needle was then reintroduced through the emergent conjunctival opening, and allowed to glide backward under the episcleral tissues for a distance of about 10 mm. before final emergence. The thread was drawn, so that the end just disappeared in the entrance of the conjunctiva, and clipped, so that the other end disappeared in the place of final emergence. This loop of coarse thread was left *in situ* for three months, with no untoward result, and then removed. The relief of tension and pain was complete, and lasted until the patient died, two years later. J. JAMESON EVANS.

(4) **Wood**, of Chicago, records three cases of absolute glaucoma and two cases of buphthalmos which were successfully treated by means of a sclero-corneal seton (Zorab-Mayou). In all the cases other operations, including trephining, had been already done without success. The cases, however, have been under observation only for about three months after the application of the sclero-corneal sutures.

To facilitate the introduction of the seton, the writer employs a narrow Graefe knife with a hole near its point. The puncture and counter-puncture are made in the sclera, as in anterior sclerotomy. When the point of the knife emerges at the counter-puncture, the hole in the knife is threaded with 00 braided silk suture, about eight inches long, and armed with a half-curved, patent-eyed needle at each end. These needles are just large enough to pass easily through the eye of the knife, and should not be more than two-thirds of an inch long. The threaded knife is withdrawn, so that about an equal length of the double suture protrudes from the puncture and counter-puncture. The loop is snipped through and the knife freed, and the four free ends of the sutures are passed by means of needles through the puncture to counter-puncture openings beneath the ocular conjunctiva, as far as the length of the needle away from the scleral punctures. J. JAMESON EVANS.

(5) **Wilmer**, of Washington, gives, at some length, the case-histories of 26 sclero-corneal trephinings, performed on the eyes of 16 patients. Eleven patients had both eyes operated. Of this number 9 had both eyes trephined at the same time; 6 eyes had been operated on previously (iridectomy in 2, Lagrange's sclerecto-iridectomy in 3, a twice-repeated Lagrange operation in 1) with only temporary reduction of tension in each case. Glaucoma was secondary to irido-cyclitis after cataract extraction in 2, to injury in 1, and to retinal hæmorrhage in 1. In 2 eyes there was chronic congestive glaucoma; in 1 eye chronic glaucoma with acute exacerbations. One patient had profuse floating opacities in the vitreous, and incipient cataract. The remaining 18 cases were of simple glaucoma. "The operative *technique* was practically the one used by Colonel Elliot, except that the flap was held by forceps, instead of being pushed down on the cornea by cotton-tipped applicator, for it was noticed that a marked striped keratitis, followed the use of the applicator, which did not occur when the forceps were used." Elliot in his book ("Sclero-corneal Trephining," p. 61, second edition, London), describes the flap as being "gently drawn downwards by traction with the closed forceps laid on it, and finding counter-pressure against the cornea." Complications appear to have been remarkably few. In two cases there was a slight tear of the conjunctiva, before Bowman's trephine was given up in favour of Elliot's instrument. "In only one case was there any

loss of vitreous, in a blind eye with abolished anterior chamber." Stitches were used in 12 cases. Atrôpine solution (1 per cent.) was instilled immediately after the operation in every case where a complete iridectomy was done. With a peripheral iridectomy, or without one, the use of the solution was delayed till after twenty-four hours had elapsed, eserine being used at the time of operation.

In 20 cases there was no iritis, in 5 a mild, and in 1 a severe iritis. "In no case was the iritis sufficiently severe to be a serious complication." In the cases with a complete iridectomy, there was no iritis. All the cases of iritis recovered quickly without any rise in tension. "*Since the operations, four eyes have suffered from severe acute contagious conjunctivitis* (*during an epidemic*), *but there was no bad effect.*" This last observation is of especial interest, in view of the alarmist views that have been entertained and expressed by some surgeons as to the inability of the conjunctival flap to protect the eye from "late infection," in the presence of an acute infection of the sac. It is of interest, therefore, to record that Wilmer is well-known to be a very skilful operator, and that according to his own statement, he has closely followed Elliot's *technique*, which he learnt at first hand. His testimony should just now have the effect of steadying some of those who have been shaken by the alarmist views that have lately been expressed in certain quarters. It would seem to bear out the contention put forward by Lagrange and Elliot, that late infections are not infrequently, to some extent at least, the product of faulty *technique*. In one case there was a marked chemosis immediately following the operation, which "seemed to be the result of a very rapid filtration under the conjunctiva." This phenomenon is not very infrequent after trephining. It would appear to be the result of (i) a very loose condition of the sub-conjunctival tissue, or (ii) of the aqueous fluid being secreted under somewhat unusual pressure, or (iii) possibly of both these factors combined. As to final results: vision was improved in 18 eyes, and unchanged in 8. Of these latter, 4 had normal vision, both before and after operation, 2 had only light perception, and 2 were blind before the trephinings. Fields of vision improved in 22 cases, and were unchanged in 4. The highest tension before operation was 85 mm. of Hg., the lowest 29 mm. Since operation the tension has not been above 20 mm., save one record of 22·5 mm. Wilmer says that in setting forth the advantages of sclero-corneal trepining, sufficient stress has not been laid on the freedom from corneal astigmatism following this, as compared with other procedures designed to produce a filtering scar. He concludes by saying "In my limited experience, sclero-corneal trephining is the easiest, safest and most effective method of permanently reducing excessive tension in all kinds of glaucoma, except the acute form, where iridectomy retains its place as one of the most universally satisfactory operations in ophthalmological surgery."

Wilmer is to be congratulated on the way he sets forth the results of what are evidently very carefully noted cases, and, still more, on the brilliant success that has followed his use of the trephine. His employment of the degree sign in lieu of writing mm. of mercury, in the record of tensions, is, we think, regrettable. We hope it does not purport another invasion of the English language. Such a usage might in time come to be accepted for convenience sake. It is, however, inaccurate, and would prove misleading to students and learners. C. P.

(7) **Hallett,** of New York, publishes the results of 12 cases of Elliot's operation, performed by him in the New York Ophthalmic Hospital, on 9 patients. The first case was done on October 24th, 1914, and the last on March 13th, 1915. They were under observation up to May 20th, 1915, the date of proof reading. "In case 1, where there was a subsiding syphilitic

plastic uveitis, a favourable result was probably not to be expected. The effect of two anterior sclerotomies and an iridectomy had been nil, and at the time an enucleation was seriously considered. When after 4 months all plastic inflammation had subsided, a beautiful result followed a second trephining, not only permitting permanent retention of the eyeball, but supplying a vision capable of counting fingers at six feet." In another case of acute recurring glaucoma, tension only subsided when a Hancock operation had followed an Elliot; the prognosis was thought to be unfavourable. There were only 3 cases in which field of vision tests were admissible, and these were all complicated by nuclear cataracts. One of them is reported as being able to read after the operation, which he could not do before. In 3 cases the trephining was done to save painful globes; all three were successful in that respect, and only one of them is now totally blind. Of the 12 cases, 6 were for simple glaucoma, the average tensions before and after operation being respectively 53 mm., and 13 mm. Four were cases of secondary glaucoma; in these the figures were 52 mm. before, and 16 mm. after operation. Two were acute cases, the average figures here being 60 mm. before, and 26 mm., after operation. It seems likely that Hallett only trephined his worst cases, or else he must have had a very bad run of cases. His results seem, under the circumstances, to have been good enough to justify his claim that they "are in line with those of other operators."

(8) **McHenry,** of Oklahoma City, published the notes of five cases in which he performed Elliot's operation. He had a "mild, quiet form of iritis in three good cases," a severe plastic form in a blind eye in which a severe intraocular hæmorrhage had taken place shortly after the operation, and a very severe plastic form of irido-cyclitis, resulting in complete failure, in a fifth case. In the last-named he believed he would have had a good result from an iridectomy had he done that operation. He is in favour of doing a complete iridectomy, instead of a partial one, in his future trephinings, and of treating his "inflammatory" cases by keeping to the old Graefe operation.

The reading of the paper elicited an interesting discussion. **Jackson,** of Denver, suggested that possibly the lowering of tension might predispose an eye to infection, by interfering with its general nutrition. He quoted two cases of his own in illustration of his point. One of these had recurrences of iritis for several months, and the other resulted in failure owing to the formation of a fibrous pad over the trephine hole. He has "never given up iridectomy for acute cases." The Elliot operation he would reserve for the cases of simple glaucoma, and for this he thinks "it is regarded as distinctly superior to any other operations we have." C. P.

(9) **Kraupa,** of Teplitz, remarks that the recent wave of enthusiasm for fistula operations in glaucoma shows signs of steady diminution. Yet their effect is good in many instances. He appears to believe that a true fistula exists for a time only, and that if cure of the disease does not come about during that period, the fistula closes, and the tension of the eyeball again rises. He enjoys an extensive glaucoma material, although in the district where he practises, the results are much influenced by the pronounced in-breeding, the tendency to arterio-sclerosis, and the fact that the population is soaked with syphilis. Among 330 operations in twelve months, thirteen Elliot's trephinings, and sixteen Heine's cyclodialyses were included. There did not appear to be much to choose between the results of these two procedures. But Kraupa found that after an unsuccessful Elliot, a Heine brought the case to a good result, and he reports the details of three such cases. He believes that inadequate filtering paths were formed by the first-named, and that the other operation contributed to complete the flow of fluid

In these cases it is doubtful whether cyclodialysis alone would have sufficed to cure the condition. SYDNEY STEPHENSON.

(10) **Harrower**, of Worcester, Mass., reports seven cases of simple glaucoma successfully treated by the operation of "Iridotasis", which he describes as follows.—After the use of one per cent. atropine and four per cent. cocaine, the speculum is introduced between the lids, the patient is asked to look down, and the conjunctiva is grasped with fixation forceps about 10 mm. above the sclero-corneal margin. A transverse cut, some 6 mm. to 8 mm. in length, going well down to the sclera, is made, and the conjunctiva is dissected to the margin of the cornea. A keratome is thrust through the sclera immediately behind the cornea, and a wound, about 4 mm. or 5 mm. in length, is made. By means of iris forceps, the free edge of the iris is seized and it is pulled into the keratome wound, leaving the under surface of the iris up. The conjunctiva is replaced. The patient can usually leave the hospital four or five days after the operation.

In the discussion that followed the reading of Harrower's communication, **Verhoeff**, of Boston, expressed the opinion that the ordinary trephine operation will be given up in favour of "Iridotasis." **Peter A. Callan**, of New York, spoke of the dangers attendant upon incarceration of the iris, and thought we should bide our time before speaking of the operation as successful. **Koller,** of New York, although formerly enthusiastic about the trephine operation, has gone back to the Lagrange-Herbert operation modified by Holth, as described in THE OPHTHALMOSCOPE of June, 1914. **D. B. Lovell**, of Worcester, Mass., spoke highly of "Iridotasis," having watched the results in a number of Harrower's cases. **Hiram Woods**, of Baltimore, quoted cases to show that incarceration of the iris is not so dangerous as many think it is. **D. F. O'Connor**, of Worcester, Mass., had followed one of the cases operated on by Harrower, where in the course of about a year, tension fell from about 40 mm. to about 28 mm. of mercury, while sight rose from 4/60 to 6/20. In his reply **Harrower** disclaimed any claim to originality in the operation, which was devised, of course, by Borthen, of Bergen, Norway.

SYDNEY STEPHENSON.

(11) **Wheelock,** of Fort Wayne, Indiana, describes a modification of Zorab's operation, the effect of which is to leave a loop of 00 braided white silk thread partly in the anterior chamber and partly in the subconjunctival tissue. The author apparently has not performed the operation he describes.

SYDNEY STEPHENSON.

(12) **Roy**, of Atlanta, Ga., has operated upon nine eyes (in five patients) for glaucoma by the method described by Borthen in 1911 (for abstract see THE OPHTHALMOSCOPE, 1912, p. 607). One of Roy's cases was of the acute inflammatory form, all the others being instances of the chronic non-inflammatory forms. The operation was successful in all the cases. His experiences lead the author to believe that iridotasis is the ideal operation in chronic glaucoma. As regards the *technique*, he lays stress upon making as small an incision as possible into the anterior chamber. A portion of a letter received by Roy, in the autumn of 1915 from Borthen may be quoted here, especially as it had been rumoured that he had abandoned his own operation. "Since 1908 I have in all performed iridotasis in 242 cases with so highly satisfactory results that I have not felt inclined to try any other. I am convinced that the reduction of tension is due not to filtration but to increased drainage through Fontana's spaces in direct consequence of stretching of the iris. It is quite unnecessary to make the conjunctival flap larger than just sufficient to cover the incarcerated iris." SYDNEY STEPHENSON.

10.—Extraction of Foreign Bodies from the Eye.

(1) Welton, Carroll B.—Extraction of metallic foreign body from vitreous by giant magnet through scleral incision. Report of case and exhibition of patient. *Ophthalmology*, January, 1915.

(2) Smith, James Royal.—An unusual magnet extraction. *Ophthalmic Record*, March, 1916.

(1) **Welton**, of Peoria, Illinois, reports a case of injury by a chip of metal from a tool. The foreign body had passed through cornea and lens into the vitreous, where it could be recognised. When first seen one hour after the accident, there was no hæmorrhage from the iris and no opacity in the lens. Eleven hours later, an opaque track could be seen in the lens periphery. The chip was removed through a scleral incision by the giant magnet. Recovery was uneventful, vision 15/20, and the greater part of the lens remained transparent.

Welton also mentions a case in which a metallic foreign body could be seen in the upper part of the lens, having been in that situation for ten years without causing any disturbance or interfering with sight.

A. J. BALLANTYNE.

(2) The case by **Smith**, of Chicago, illustrates anew a tolerably well-known point in the extraction of foreign bodies from the eye with the magnet.—A fragment of steel was lodged in the posterior part of the vitreous, and an attempt to remove it with the magnet through a scleral incision failed. Five days later, the operation succeeded in extracting a splinter of steel (3 mm. or 4 mm. long), in consequence of applying the magnetic force in the direction of the long axis of the particle, so as to bring it out end first. The first attempt had failed because the splinter was attracted broadside on in such a way that its long axis lay across the opening in the sclera.

SYDNEY STEPHENSON.

11.—Strabismus and Muscular Imbalance.

(1) Oppenheimer, E. H.—Case experiences. (Kasuistische Erlebnisse.) *Wochenschrift f. Therapie u. Hygiene d. Auges*, January 5th, 1911.

(2) Jackson, Edward.—Operations on the extra-ocular muscles. *Ophthalmic Record*, November, 1914.

(3) Worth, Claud.—Operation for squint. *Ophthalmic Record*, December, 1914.

(4) Todd, Frank C.—Extra-ocular tendon lengthening and shortening operations, which enable the operator to regulate the effect. *Ophthalmic Record*, December, 1914.

(5) O'Connor, Roderic.—New operative proceedings for shortening and lengthening muscles. *Ophthalmic Record*, December, 1914.

(6) Valk, Francis.—Strabismus. *Ophthalmology*, April, 1915.

(7) Valk, Francis.—Strabismus. *Ann. of Ophthalmology*, July, 1915.

(8) Posey, Wm Campbell. Tenotomy of the oblique inferior muscle. *Trans. Amer. Ophthal. Society*, Vol. XIV, Part 1, p. 65, 1915.

(9) Hardy, William F.—A muscle advancement. The combined use of the advantageous principles of Worth and Hulen. *American Journal of Ophthalmology*, December, 1915.

(10) **Duane, Alexander.**—**Torticollis, relieved by tenotomy of the inferior oblique.** *Arch. of Ophthalmology*, Vol. XLV, No. 1 (January, 1916).

(11) **Gifford, Harold.**—**A tension suture for advancement operations.** *Ophthalmic Record*, March, 1916.

(1) In a short paper **Oppenheimer,** of Berlin, describes several interesting experiences. The first case was a young mason for whom an advancement had been done, and the strabismus cured; but diplopia developed, and persisted, preventing him returning to work because of vertigo on mounting scaffolding. After three months the *status quo ante* had to be restored, as the patient wished to go back to work in spite of the squint. In the other cases refractive errors had been overlooked, and when corrected, gave a most successful issue to the treatment which was being carried out. W. B. INGLIS POLLOCK.

(2) **Jackson,** of Denver, Col., contributes a very interesting and instructive article on operations on the extra-ocular muscles which must be read in the original to be properly appreciated. His purpose is to point out certain general principles and fundamental facts of the ocular movements, attention to which is essential to successful operative interference on the extra-ocular muscles. He gives the following *résumé* of the main points emphasized in his paper:—

"That these muscles do not act alone, but each movement or position of the eyeball, depends on co-operation and mutual adjustments of many, or all of these muscles.

"That in lateral squint, secondary adductors and abductors may be as important to consider as the primary adductor or abductor.

"That dominance of the primary adductor and abductor must be preserved to secure stable equilibrium of the eye near the centre of the field of fixation.

"That vertical squint requires an operation changing the relative extent of the various functions performed by the same muscle; and

"That careful application of physiologic principles will materially extend the field for operative interference with the extra-ocular muscles."

J. JAMESON EVANS.

(3) **Worth,** of London, England, describes his operation for advancement of the rectus, which is "to be found in many text-books and journals," together with some minor improvements in *technique*. He gives his reason for having adopted advancement to the exclusion of tenotomy in any form.

J. JAMESON EVANS.

(4) **Todd,** of Minneapolis, describes in detail his methods of tendon lengthening and tendon tucking, which have not been materially modified since their original publication in 1905 and 1907 respectively.

Tendon lengthening does away with the dangers of over-correction, and defective post-operative insertion of the completely-cut tendon. Tendon tucking also enables the operator to regulate the effect desired, securely fastens the tendon, so that there is no danger of the stitch cutting its way through, and producing the effect of tenotomy, and there is no tendency to alteration of the plane of rotation. Almost any degree of correction, up to 40 degrees or so, can be produced by operating upon one eye.

By using the tendon tucker, the operation is easily performed. The after-treatment is certainly not more troublesome than that of other forms of advancement. J. JAMESON EVANS.

(5) **O'Connor,** of Oakland, Cal., has devised an operation for shortening or advancing of ocular muscles, in which the principle involved is new, and its employment is calculated to produce more uniform and successful

results in operations for squint. His operation is designed to avoid the following factors, which operate against successful results :—

1. Constriction of tissues by the sutures or ligatures employed.
2. Tension on the point of union by the operated muscle and its opponent.
3. The anatomical formation of the ocular tendons with fibres parallel and loosely held together conducing to slipping of the tendon through a suture unless tied tightly enough to cause constriction.
4. Stretching of the operated muscle causing paresis.

The author's operation is minutely described in the original, which should be consulted for details. Briefly, the muscle tendon is clearly exposed and split into three portions—two narrow marginal strips and a broad central part. The marginal strips are not divided, but are shortened by means of double half-hitch catgut loops, which are so applied that when tightened the loops are transferred from the catgut to the tendon strips, which are then held in position by a thin catgut ligature. The central portion of the tendon is divided near its insertion, shortened and advanced into the undermined conjunctival flap over the original insertion, and stitched in position by a double suture so arranged that it causes no constriction of the tissues. "The central section is now shortened and held against the original insertion, this point being free from tension unless the shortening exceeds that of the margins."

The amount of shortening may be varied by (a) the size of catgut (b) the width of the tendon strip.

The method produces no torsion or vertical deviation when carried out as described, but it may be modified to correct torsions as follows :—"(a) One margin can be shortened, the other left untouched, (b) both can be shortened, but one more than the other by using different sizes of catgut. (c) One margin may be tenotomised, the other shortened. This would be equivalent to Steven's 'extendo-contraction' with the 'contraction' a closer approach to certainty."

O'Connor has also his own method of performing graduated tenotomy which consists in freely exposing the tendon, which is then split along the centre, performing a real central tenotomy as close as possible to the scleral attachment, leaving only four or five fibres at each margin, then making lateral cuts 4 or 5 mm. behind the central cut and more or less parallel with its retracted edges. The effect is tested with the phorometer.

In the treatment of squints he is guided by the following principles :—

1 To divide the effect between the pair of muscles involved in proportion to the degree of involvement of each.
2. To advance or shorten the weaker muscles to secure a balance of strength.
3. To reserve tenotomies for use only as an aid to advancement or shortening.
4. To allow long intervals between operations, so as to determine the permanent effect of the last one, as judged by fixed findings on repeated examinations at definite intervals. J. JAMESON EVANS.

(6) **Valk**, of New York, holds that present-day views on squint fail to arrive at the true primary cause which underlies all forms of strabismus ; nor do we yet understand why one case is cured by the use of glasses and another not, why convergent squint may accompany myopia, etc. He reviews the different factors to which concomitant squint has been attributed, such as errors of refraction, heterophoria, amblyopia, etc., and concludes that the true or primal cause present in all cases is deficient power of rotation in a given direction, and that all the rest are merely contributing causes. This being

so, he thinks all cases should be submitted to operation ; but the operation should be suitably chosen in each case, being based on the indications of the tropometer. Short of faulty *technique*, he does not think there should be any such thing as operative failure. Believing, as he does, that the strabismus is due to a primary anatomical defect, he advocates in every case an operation which will strengthen the rotating power of the defective muscle or muscles. Instead of advancement, he prefers shortening. He shortens both external recti, and if that is not enough, does a graduated tenotomy of the internal. The same procedure serves for cases of heterophoria. A. J. BALLANTYNE.

(7) **Valk,** of New York, contributes an article on strabismus, which certainly has the merit of leaving the beaten track. He is " not willing to accept any of the theories (of strabismus) that have been advanced during the past twenty years," or indeed any of those offered before that ; and he gives his reasons for taking up such an attitude. All squints and all heterophorias have as their cause a defect in the muscle or muscles concerned. The operative treatment should be directed to the relief of the defect present. Valk is " much inclined to think " that " all cases of latent and fixed squint should have an operation." We must operate according to the indications furnished by the tropometer. Faulty operative *technique* is always to blame for failures after strabismus operations. " Strabismus of any form (paretic cases excluded) is due to a deficiency of rotation of the eyeball from purely anatomic causes, and consequently a strengthening operation is always indicated." The above brief and, perhaps, scrappy summary gives some indication of the scope of a rather unusual paper, which is well worth perusal and study, even though the absolutism of some of its statements will rouse opposition in the minds of a number of those who read it. R. H. ELLIOT.

(8) Notes of twenty cases in which the inferior oblique muscle was tenotomised (an operation originally suggested in 1885 by Landolt) are given by **Posey**, of Philadelphia. The conditions dealt with included : 1. insufficiency of the superior rectus of one eye and over-action of the inferior oblique of its fellow ; 2. insufficiency of both superior rectus muscles, with over-action of both inferior obliques ; 3. insufficiency of the superior oblique with spasm of the inferior oblique of the same eye ; and 4. mixed cases. Details of the operation follow.—After anæsthesia has been secured by injection of a 2 per cent. solution of novocaine, a curvilinear incision is made down to the bone just superior and parallel to the lower and inner bony rim of the orbit. A squint hook is inserted into the wound thus made, and " gentle traction made upon the tissues until the muscle is encountered. This is assured by the upward motion imparted to the globe by traction on the hook." The tendon is then divided. The wound is closed by one or more sutures. The results of the tenotomy were all more or less satisfactory. The tilt of the eye usually disappeared, while in many instances there was immediate relief from traction and diplopia. Posey believes that the operation is of great value in relieving the up and in tilt imparted to the eye by the over-action of the muscle in conjugate lateral movements where the superior rectus of the fellow eye is paretic.

Discussion.

Duane, of New York, thought that the most important indication for the operation is in that somewhat frequent congenital anomaly where paralysis of the superior rectus was associated with secondary deviation of the inferior oblique in the opposite eye. The picture of these cases of ocular torticollis is so characteristic that diagnosis can be sometimes made even at the age of a few months. A second indication for operation was to be found in paralysis of the superior oblique with secondary deviation of the inferior oblique in the same eye. In performing the operation, the incision is made at the intersection of the lower orbital margin with a perpendicular dropped from the supraorbital notch (Terrien). The inferior oblique will be found if the hook is swept inward, with its point turned inward and upward. In searching for the tendon, it is advisable to keep close to the floor of the orbit and well to the inside, so as to grasp the tendon near its origin. By the adoption of these precautions, one also avoids the aponeurosis of the inferior rectus, which may be connected with the inferior oblique by slips of fascia. Duane sees no objection to operation at an early age if the symptoms are at all pressing.

Zentmayer, of Philadelphia, to whom four of the cases placed on record by Posey belonged, confirmed the simplicity of the operation and its beneficial results. In one instance the remote was not so good as the immediate result.

Shumway, of Philadelphia, and **Weeks,** of New York, also took part in the discussion, to which Posey replied. SYDNEY STEPHENSON.

(9) Modestly and with diffidence, **Hardy,** of St. Louis, describes an advancement operation which combines the muscle stitch of Worth with the scleral stitch of Hulen. Incidentally, the author takes two scleral bites with the one stitch, bringing the needle out and re-entering it, so as to obtain greater length of grip with no greater depth. It is not possible to describe the procedure within the limits of an abstract, and in any case the understanding of the operation is dependent on the drawing which accompanies the description. ERNEST THOMSON.

(10) **Duane,** of New York, gives the notes, with excellent illustrations, of the case of a little girl, who had tilted her head on to her right shoulder from the time she was four months old until she was nearly four years of age. When the head was straightened by means of a brace, the left eye deviated upwards; when the left eye was bandaged, the child held her head straight There was a left hyperphoria of 20°. A diagnosis was made of congenital insufficiency of the right superior rectus muscle, and a complete tenotomy of the left inferior oblique was undertaken, *at its origin*, with the result that the head at once straightened its position. Previous cases of the same nature are discussed. The danger of mistaking the case for one of true torticollis, which occurred in this very instance, is dealt with from the side of differential diagnosis. The *technique* of the procedure for dividing the tendon of the inferior oblique at its origin is described.

Other congenital deviations are discussed, as also are the questions of other forms of treatment, of the best time for operation, etc. R. H. ELLIOT.

(11) For the purpose of relieving tension on the sutures after the external rectus has been advanced, **Gifford,** of Omaha, inserts a suture through the internal rectus and the overlying conjunctiva, and then passes one of the two needles which are used in the operation, through the free edge of one lid at about the junction of the middle and outer third of the latter. The other needle is passed at a corresponding spot in the other lid. The globe is then turned outward, and the sutures are tied just tightly enough to bring the lids down to the surface of the eyeball. By these means the globe is temporily anchored in a position of abduction, and any strain upon the sutures holding the external rectus in its new position is obviated.

Gifford states that since he has employed this tension suture, his advancement results have decidedly improved. SYDNEY STEPHENSON.

12.—Cataract.

(1) **Fisher, William A.—A new and safe technique for the cataract operation.** *Ophthalmology*, July, 1915.

(2) **Newman, E. A. R. Lt-Colonel, I.M.S.—Irrigation after extracapsular extraction of cataract.** *Indian Medical Gazette*, November, 1915, Vol. L, p. 403.

(3) **Smith, Henry, Lt.-Colonel.—Conjunctival flaps in cataract operations.** *Indian Medical Gazette*, January, 1916.*

(4) **Nath, Lala Baij (Jullundur, India). — The "new" method of extraction of cataractous lenses.** *Indian Medical Gazette*, February, 1916.

(5) **Lister, A. E. J., Major I.M.S.—The training of the assistant in Smith's operation for the intracapsular extraction of cataract.** *Indian Medical Gazette*, February, 1916.

(6) **Lister, A. E. J., Major I.M.S.—A note on the use of conjunctival flap in operation for the intracapsular extraction of cataract by Smith's method.** *Indian Medical Gazette*, February, 1916.

(7) **Smith, Lt.-Colonel Henry.—The new operation for cataract.** *Indian Medical Gazette*, February, 1916.

(8) **Green, A. S., and Green, L. D.—The radical cataract operation: causes for its failure and how to overcome them.** *Ophthalmic Record*, March, 1916.

(1) **Fisher,** of Chicago, in a paper read before the Chicago Ophthalmological Society, March, 1915, is convinced that the profession will adopt the intracapsular extraction of cataract, provided the two great drawbacks of the method—lack of properly trained assistance and loss of vitreous—can be avoided. He is of opinion that these two obstacles have been removed by his invention of lid hooks and a needle. He describes Smith's *technique*, as imparted to him by Smith himself, under several headings.—The preparation of the patient, the various steps in the operation, *viz.*, iridectomy, the first and second step in lens delivery, the toilet. Several illustrations are given of the various steps, as well as of the instruments mentioned. The author then goes on to describe "two absolutely" new details in the *technique*, namely, the use of the lower lid hook and the employment of the needle to assist in the delivery of the lens when there is threatening or actual loss of vitreous. He prefers to remove the lens with the needle when a slight loss of vitreous has occurred, and failing in that, to use the Smith spoon. He thinks the majority of operators will prefer the needle to the spoon even though the capsule were often ruptured. The latter will naturally fall or be pulled down and away from the wound when shreds of capsule, which produce post-operative inflammation, are not likely to get caught in the corneal wound. The details of the *technique* of operation on the left eye are briefly given, and accidents, complications, and after-treatment are discussed. He keeps his patients in bed for nine days, and four days more if the wound is not healed at the first dressing on the ninth day. He declares that proficiency in the method can soon be gained by learning to control the lids of human eyes that are anæsthetised, and by operations on pigs' eyes.

There was a discussion after the paper. A. J. BALLANTYNE.

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* This article was published in full in THE OPHTHALMOSCOPE, of March, 1916.

(2) This is an analysis by **Newman**, of Alipur, of 250 cataract extractions by the ordinary or extra-capsular method assisted in 92 per cent. of the cases by irrigation of the anterior chamber. It includes an earlier series of 102 operations reported in June, 1914. Secondary needling was performed in 2·4 per cent. of the cases. Iritis followed in 5·6 per cent., an unusually high proportion. The reviewer would venture to connect this with a detail of the irrigation procedure. It is noted that the washing was carried out with the speculum *in situ*, elevated by an assistant, thus the wound would frequently lie in a pool of fluid favouring entry of conjunctival organisms during the irrigation.

Vitreous escape occurred in only 2 per cent. of operations. In one instance it was attributable to the irrigation. To avoid this complication, laterally slotted nozzles were used, the point only was introduced into the outer angle of the wound, directed transversely, the lateral opening then directed the fluid where required, and fixation of the globe was avoided.

Newman is inclined to agree with Maynard that after incomplete irrigation the absorption of residual cortex is slower than after operations without irrigation, but with increased experience, he is more and more favourably impressed with the method. H. HERBERT.

(3) **Colonel Smith**, of Amritsar, India, gives his opinion on conjunctival coverings of the wound in cataract extraction, "after a fair and liberal personal experience." Subconjunctival extraction, or operation with incompletely separated flaps, is included in the discussion.

In intracapsular extraction the flap used by Stanculeanu (van Lint's) is held to be by far the least objectionable, as it affords an opportunity of dealing with complications, such as ruptured capsule and escape of vitreous, and admits of easy replacement of the iris. But it not infrequently was found to fail to retain its position. Instead of maintaining by its pressure close apposition of the sclero-corneal wound, thus preventing prolapse of the iris, it is sometimes retracted early, becoming adherent in the wound and leading to serious complications.

Unfortunately, the only conjunctival flap, cut with the knife during the making of the corneal section, apparently tested by Colonel Smith, is much more extensive and longer than that in common use. It consequently led at times to excessive astigmatism, due to the deep wound opening up under the conjunctiva from pressure of aqueous as soon as the conjunctival flap became adherent. Also in this way evidently a filtering cicatrix was found to develop, as has been described by the reviewer. But the distinction has not been drawn by Colonel Smith between this truly filtering cicatrix and the "cystoid" scar responsible for late infections. Late infection has not been found associated with the cicatrices resulting from these long gaping cataract wounds, apart from incarceration of iris, etc. Owing to the omission of the ordinary limited conjunctival flap from Colonel Smith's experience, the conclusions, summing up entirely adversely to conjunctival flaps in general, are rendered useless and more or less untrue. Trouble with hæmorrhage into the anterior chamber at the time of operation and afterwards, appears to show that adrenalin solution was not instilled beforehand at the proper time.

With regard to flaps, partial or complete, requiring dissection with scissors, objection is made thus :—"The time spent on the operation is quadrupled ; thus rendering a good patient a very troublesome one before the operation is finished." This objection only holds, however, in operating by upper section. For patients with doubtful self-control, Czermak's lower subconjunctival operation is peculiarly appropriate.

The following statements are made with regard to iris: "No matter what flap is made, it cannot for a moment claim to be protective against prolapse of iris." It is better for it (iris) to be prolapsed and exposed than to be prolapsed under the conjunctiva, where it is more difficult to deal with."

To quote further: Conjunctival flaps have a *raison d'être* in the capsulotomy operation, in that tags of capsule frequently hang out of the sclero-corneal wound . . . . , constituting a drain for the infection of the remaining lens matter . . . . ; a conjunctival flap shuts off this drain. Such tags do not remain when the lens has been removed in its capsule, and consequently such protection, both in theory and in practice, is not necessary." How about frequent disastrous incarceration of iris and of vitreous in the intra-capsular operation? Why should these incarcerations not need covering up at least as much as inclusions of capsule?

H. HERBERT.

(4) This assistant surgeon states that he has been extracting lenses intracapsularly by the same method as his friend, Assistant Surgeon Hari Shankar, and for the same period, *viz.*, over two years. But this method, which he describes, is simply the making of an ordinary long conjunctival flap by dissection, as the first stage of the operation. Adrenalin must be instilled at least ten minutes beforehand, and he admits that the patient *must be steady*. H. HERBERT.

(5) **Major Lister**, of Lucknow, India, has found it best to train the assistant to retract the upper lid and brow according to Smith's method in simple operations, such as iridectomies. The operator can then devote his attention largely to the assistant, who thus gets accustomed to the manipulation required. He acquires confidence, and the muscles of his hand become stronger, so that he is able to control the orbicularis for prolonged operations.

When Lister has had to operate on cataract with untrained assistants, he has used two assistants, and one of them holds up the lid with the strabismus hook, while the other pulls up the eyebrow with the thumb of the hand corresponding to the eye operated upon. The respective positions of the two assistants are rehearsed beforehand. It is possible to arrange that the hands of the assistants are not in the operator's way. Once the man controlling the brow has got a firm hold, he can stand at the full length of his arm and so keep his body out of the way. In this way Lister has operated without accident upon most violent "squeezers." H. HERBERT.

(6) **Major Lister**, of Lucknow, India, one of Smith's pupils, who operates for cataract mainly by Smith's intracapsular method, frequently uses a conjunctival flap. But he rejects the flap in operating upon "cases with deep anterior chambers indicating shrunken cataracts, patients with very prominent eyes in which what Herbert describes as 'vitreous tension' is often present, cases in which suspensory ligament has been ruptured either accidentally or, as is so common in India, by the 'lens coucher,' and very nervous patients." In other cases he prefers the conjunctival flap, because with it he is not afraid to make the sclero-corneal incision slightly larger than the one which Smith has employed. This reduces the number of ruptures of capsule to a negligible quantity. In his experience, a slight increase in the size of the incision in very old and feeble patients markedly retards healing, and in such cases a conjunctival covering is especially useful.

He agrees with Smith that the conjunctival flaps made by preliminary dissection impose a great strain upon the patient's self-control, but he still uses them occasionally. Any form of conjunctival flap greatly increases the difficulty of dealing with vitreous escape. H. HERBERT.

(7) This is a description and a criticism by **Smith**, of Amritsir, India, of a sub-conjunctival intracapsular extraction of cataract, at present being

practised by an assistant surgeon, Hari Shankar, at Delhi. Remarks had been made by Colonel Bamber and Lt.-Colonel Maynard in the hospital visitors' book, approving of the method ; and these remarks apparently have been quoted extensively in the English and vernacular press in India.

A limited conjunctival opening is made some distance above the cornea, and a large sub-conjunctival pouch made as in Czermak's method. But the sclero-corneal incision is cut entirely with a Graefe knife, the conjunctival opening being levered down by the back of the knife, after the point of the blade had been passed down under the loosened conjunctiva to the site of puncture at the limbus. The expulsion of the lens is, apparently, as in Smith's operation.

Smith finds nothing new in the method. He emphasizes the drawback that few patients can keep their eyes fixed for so prolonged an operation, and suggests other disadvantages, while denying any protection against infection to be derived from the conjunctival covering. H. HERBERT.

(8 This helpful and well-written article by **A. S. Green** and **L. D. Green**, of San Francisco, deals with Smith's intracapsular extraction of cataract, the *technique* of which they learned from Smith himself in India.

The authors group the principal causes of failure as follows :—(1) incorrect incision ; (2) faulty *technique* in expressing the lens ; (3) inefficient control of the eyelids ; and (4) improper after-treatment.

1. The incision must embrace fully one-half of the cornea. A small incision spells failure.

2. It is not the amount of pressure used in the intra-capsular operation that determines a successful delivery of the lens, but the way in which it is applied. In this respect we must distinguish between Morgagnian and all other varieties of senile cataract, for the *technique* is different in the two classes. In ordinary cataract a small squint hook is employed, the right angle end of which is not over 5 mm. or 6 mm. in length. This is placed flat on the lower part of the eye, and pressure is steadily made towards the optic nerve. The moment the upper edge of the lens presents in the wound, the hook is made to glide upwards, following the lens, while the pressure is at the same time somewhat lessened. This is stated by the authors to be the critical point of the operation, inasmuch as failure to follow up the lens instantly may mean loss of vitreous, and even dislocation of the crystalline into the vitreous chamber. Contrast with this the *technique* for the delivery of the Morgagnian cataract. The hook is placed just above the lower border of the cornea with the tip pointing directly into the eye. Pressure is then made backwards towards the optic nerve, and at the same time downwards towards the patient's feet. This ruptures the suspensory ligament below, and causes the lens to turn a somersault, so that the lower edge appears first in the wound. As soon as the edge of the lens appears, the hook, as in the delivery of the solid form, follows up and tucks the cornea beneath, and the lens is finally lifted away with the concave surface of the hook.

3. Nothing has militated more against the general adoption of the radical cataract operation than the difficulty of controlling the eyelids No small part of Colonel Smith's success has been due to his highly trained native assistants. In order to secure efficient control of the lids, the authors have devised a form of elevating speculum. All the time this instrument is in the cul-de-sac, the blades are slightly raised from the eyeball. It is introduced when the operation is begun, and not removed until the toilet of the wound is completed.

4. As soon as the operation is completed, some eserine ointment (0.5%) is placed in the lower cul-de-sac. Bandages must not be disturbed, or the eye

inspected, for at least five days after operation. Even then, the lower lid only is drawn down and an antiseptic ointment introduced into the lower conjunctival sac. Under no circumstances, should the patient be directed to look down. The eyes are again bandaged for a further term of five days. The patient is kept in bed for the first twenty-four hours. He sits up on the fifth day. The bandages are removed on the tenth day. The patient is cautioned not to look down or to strain during the next few weeks.

SYDNEY STEPHENSON.

13.—Operations on the Pituitary Body.

(1) **Szily, A. v.—Operations on the pituitary body. (Ueber Hypophysis-operationen.)** *Klin. Monatsbl. f. Augenheilkunde*, February, 1915.

(2) **Cope, V. Zachary.—The pituitary fossa and the surgical methods of approach to it.** *Lancet*, March 18th, 1916.

Discussing the operations devised for removal of the pituitary body, **v. Szily**, of Freiburg i. B., points out that the methods based on the *technique* of general surgery, such operations, for example, as those introduced by Horsley, Kocher, and others, carry a serious risk of post-operative meningitis, as well as causing in certain cases a definite disfigurement. Some of these methods have had a fairly high mortality.

The author tells us that the surgery of the pituitary has made a marked advance since it was taken up by the rhinologists, accustomed, as they are, to operating within a very narrow field, and to the use of specula, reflected light, and intubation narcosis. A description is given of Hirsch's two methods, the first involving an approach to the pituitary through the nasal fossa, and the ethmoid and sphenoid sinuses, the second consisting in a submucous removal of the nasal septum, vomer, and perpendicular plate of the ethmoid, which allows access through the sphenoid sinus to the pituitary without entering the nasal fossæ. But the operation to which v. Szily gives his approval is what he calls the "paranasal" or "orbito-ethmoid" operation of Chiari. Of this procedure seven examples have already been published without a death, and in the present paper two further cases, successfully operated on by Kahler, are reported. The first step in the operation is a skin incision like that used for operation on empyema of the ethmoid, namely, along the nasal margin of the orbit. By resection of the nasal process of the superior maxilla and of the ethmoidal portion of the wall of the orbit, the surgeon gains access to the sphenoid sinus, and through it to the pituitary body.

These operations, the author believes, may be considered as in a sense equivalent to a decompressive trephining, since they relieved the pressure of the tumour on the visual paths by allowing it to grow in an extracranial direction. It has even been suggested that such an operation might be done in cases with increased intracranial pressure, to allow permanent drainage of intracranial fluid, as happens spontaneously in cases of hydrorrhœa nasalis.

On the basis of reported cases, and those to which he now directs attention, v. Szily is of the opinion that development of hemianopsia of undoubted pituitary origin is a definite indication for this operation. The clinical details and the indications for operation should be worked out by the oculist, but the operation should only be carried out by one skilled in the special *technique*.

A. J. BALLANTYNE.

(2) **Cope**, of London, discusses the best way of reaching the pituitary fossa surgically. The methods of approach, which are numerous, may be

direct through the cranium or indirect through the facial skeleton. These are arranged in tabular form by the author, as follows :

Cranial.

Temporal—
  Intradural (*Horsley*)
Temporal—
  Extradural (*Braun*)

Frontal (*Krause*)
Fronto-orbital (*Frazier*)
Callosal puncture

Facial.

Nasal—
  Septal resection (*Schloffer*, *Hirsch*, *West*, *Cushing*, *Kanavel*, *Halstead*, *etc.*)
Nasal—
  Ethmoid resection (*Hirsch*)

Para-nasal (*Chiari*, *Kahler*)
Palatal (*Konig*, *Preysing*)
Maxillary
Suprahyoid pharyngotomy

Cope describes in detail only four of the foregoing methods, namely, (1) temporal method ; (2) Schloffer's nasal operation and its modifications, (3) the Hirsch-Cushing submucous nasal operation, and (4) Frazier's fronto-orbital route.

Cope considers that two of the operations have proved fairly satisfactory in approaching the pituitary fossa, *viz.*, the Hirsch-Cushing submucous nasal method, and fronto-orbital method of Frazier. In the great majority of cases, the fronto-orbital route is the more suitable. The author has adopted this operation in three cases with success. Now that the mortality of the operation has been reduced to 8.6 per cent. (in 23 cases), surgeons will be the more inclined to urge early operation in patients with oncoming blindness due to pressure on the chiasma.

Among the advantages of the fronto-orbital route Cope enumerates the several facts that it provides an aseptic mode of approach, allows each step to be carried out by the aid of sight, and does not necessitate much dislocation of the brain, as do some other methods, as the temporal. Another point is that the primary enlargement of hypophyseal tumours is towards the brain, and the enlarged gland thus presents an easier object for attack. Cope is not familiar with a *post-mortem* record of any case with eye symptoms in which there was not a large intracranial extension of the growth. Disadvantages of this particular operation are that œdema of the eyelid follows its performance, and that in some instances the eyeball may not be left quite on the same level as the opposite one. The drawback last-named, however, may be avoided by care at the time of the operation.

Finally, a few words may be devoted to a description of the fronto-orbital operation as performed by Frazier :—

The relation borne by the frontal sinuses to the supra-orbital margin is first ascertained by means of transillumination. An osteoplastic flap is then formed in the frontal region, the patient being under the influence of a general anæsthetic. The incision begins at the external angular process, and is continued along the supra-orbital ridge until it reaches the mid-line at the root of the nose. It is carried vertically upward until well within the line of the hairy scalp, and is, lastly, directed horizontally outward and returned to the temporal region on a level with the beginning of the incision. The bone flap is then turned outwards. The outer part of the supra-orbital ridge is removed in wedge-shaped way so that it may be replaced without mechanical fixation. After the periosteum is freed, the roof of the orbit is removed with *rongeurs* as far back as the optic foramen. A small opening may be made in the dura to allow of the escape of cerebro-spinal fluid and thus to permit of greater displacement of the frontal lobe. The contents of the orbit are then displaced downwards and outwards, and the frontal lobe (still covered with the dura) is elevated until one sees the optic nerve as it passes on toward the sella Turcica. The last step is to incise the dura in a horizontal direction for a distance wide enough to admit the blade of a retractor and to expose the contents of the sella Turcica. Elsberg, it should perhaps be added, avoids the visible vertically placed scar by making the base of the flap in the mid-line, and also removes the orbital margin with the bone flap. SYDNEY STEPHENSON.

14.—High Myopia.

(1) **Thompson, A. Hugh.**—**Late results of operative treatment of high myopia.** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, December, 1915.

(1) **A. Hugh Thompson,** of London, gives the late results obtained in 15 eyes (14 patients) after periods of from 5 to 15 years. These results are summarised in the table given below.

TABLE I.

Name	Sex	Age at time of first operation	Diopters of myopia	Best vision with a glass before operation	Number of years from first operation, with latest date seen	Best vision without glass at latest testing	Best vision with glass at latest testing	Remarks
A. L.	F.	17	—22	$\frac{6}{60}$	6 to 1911	$\frac{6}{60}$	$\frac{6}{18}$	—
R. E.	F.	17	—17	$\frac{6}{18}$	9 to 1913	$\frac{6}{12}$	$\frac{6}{12}$	—
R. A.	F.	25	—16·5	$\frac{6}{24}$	10 to 1914	$\frac{6}{18}$	$\frac{6}{12}$	(1914) macular changes in unoperated eye; hæmoptysis, aged 35.
R. B.	F.	16	—16·5 (left eye)	$\frac{6}{18}$ (2 let.)	8 to 1912	$\frac{6}{24}$	$\frac{6}{18}$	—
		19	—14·5 (right eye)	$\frac{6}{24}$ (2 let.)	5 to 1912	$\frac{6}{24}$	$\frac{6}{18}$	—
I. C.	F.	9	—16	$\frac{6}{60}$	8 to 1914	$\frac{6}{12}$ (2 let.)	$\frac{6}{12}$	Mother of the patient a high myope with macular degeneration.
L. F.	F.	6	—16	Too young to test	7 to 1915	$\frac{6}{24}$	$\frac{6}{12}$	—
S. P.	F.	17	—19	$\frac{6}{18}$ (2 let.)	7 to 1915	$\frac{6}{18}$	$\frac{6}{12}$	—
W. W.	M.	22	—20	$\frac{6}{60}$	5 to 1915	$\frac{6}{18}$	$\frac{6}{18}$	—
M. T.	F.	22	—16	$\frac{6}{18}$	8 to 1915	$\frac{6}{12}$ (2 let.)	$\frac{6}{12}$	Macular hæmorrhage eight months after operation; this cleared up, leaving no trace.

The table shows that ten eyes possess, after an average period of eight years, materially better vision than they had before operation, and that nine out of ten of these eyes obtained vision of 6/24, 6/18, or 6/12, without any glass.

TABLE II.

Name	Sex	Age at time of first operation	Dioptres of myopia	Best vision [illegible] before operation	Number of years from first operation [illegible]	Best [illegible] operation	Duration	Latest vision	[illegible]
L. B.	F.	6	—18	[illegible]	[illegible] to 1915	[illegible]	10 years		Macular hæmorrhage and degeneration in both eyes
M. M	F.	12	—16	[illegible]	[illegible] to 1915	[illegible]	6 years	[illegible]	Choroiditis ; an attack of cyclitis six years after operation, which cleared up
D. H	F.	15	—17.5	[illegible]	[illegible] to 1913	[illegible]	Uncertain		Macular degeneration
A. B	M	18	—20	[illegible] (1 let.)	[illegible]	[illegible]	5 years	P. L.	Macular degeneration ; second eye also affected with macular degeneration, but [illegible]
R. J	F.	21	—18	[illegible]	[illegible] to 1913	[illegible]	4 years	[illegible]	Iritic membrane ; pyorrhœa alveolaris

The second table shows that in five instances the eyes have gone more or less wrong after enjoying good sight after periods varying up to ten years. The disaster in three out of the five cases was due to macular degeneration. One of the other patients suffered from irido-cyclitis, associated with pyorrhœa alveolaris, and a pupillary membrane re-formed each time it was needled. The bad result in the other patient was due to uveitis, but whether that was connected in any way with the operation performed six years before, Thompson is not prepared to say.

It is noteworthy that among the unfortunate cases in Thompson's series there is not one of failure due to detached retina. He feels doubtful whether a highly myopic eye is more subject to detachment after operation than it was before. He adduces figures which go to bear out this view, that the surgical treatment of high myopia does not counteract the tendency of the long axis of the eyeball to increase.

A few other points brought out by Thompson may be glanced at.—The degree of myopia most suitable for operation is anything between 16 D. and 22 D. In the case of young children (in whom the condition is likely to be progressive), however, he would place the limit at 14 D. He would not operate upon an eye with much choroiditis, and especially not upon one the macular region of which was affected by degenerative changes. As to *technique*, the author freely needles the capsule of the lens. On an average, the total number of operations required from start to finish has been between three and four.

SYDNEY STEPHENSON.

15.—Skin Grafting.

(1) Kuhnt.—Further communications regarding skin grafting after removal or diminution of the globe associated with shrinkage of the conjunctival sac. (Weitere Mittheilungen ueber die Uebertragung von Hautschollen nach Beseitigung oder Verkleinerung des Augapfels bei eingeengtem Bindehautsach. *Zeitschrift für Augenheilkunde*, January-February, 1913.)

(2) **Parker, Walter R.—Skin grafting. The use of vaseline in cutting, and the open-air treatment of Thiersch grafts.** *Ophthalmic Record*, March, 1916.

(1) **Kuhnt**, of Bonn, has already recommended (*Zeitschrift für Augenheilkunde*, Vol. XVIII, p. 152) in cases of shrunken conjunctival sacs after chronic trachoma, or after burns and cauterization, or when the eye has been excised, that a large Thiersch skin graft should be employed, because this procedure often enables an artificial eye to be worn. Further experience has convinced him of the value of this procedure. It produces a permanent effect, although naturally the graft shrinks somewhat. The periphery of the graft must be tucked some millimetres under the retracted conjunctiva, and it must be gently pressed into the orbital tissue by an appropriate plug of gauze.

The method is equally useful if the eye be not excised but eviscerated, with or without the insertion of a piece of fat or charred bone into the scleral sac. It is, however, necessary in the latter case so to tie the sutures that the knot lies inside the globe, and not outside. If the knot lies outside, the graft necroses over it, and a large central piece may slough. Kuhnt says that the movement of an artificial eye placed over an eviscerated globe is markedly better than after enucleation, especially if the tendons of the recti be sewn to the conjunctival sac, and are so prevented from retracting excessively. The result is even better if the sclera be filled with fat or with a ball of charred bone, only it must not be too large.

T. HARRISON BUTLER.

(2) A brief and modest communication by **Parker**, of Detroit, gives most careful information with regard to the *technique* of skin grafting, based upon the author's experience in correcting defects in and about the eyelids with Thiersch grafts.

After preparing the skin to be grafted in the usual way, Parker suggests that skin and blade be thinly smeared with sterile vaseline, inasmuch as in that way the tendency of the skin to move with the knife (one of the greatest difficulties in the successful cutting of grafts) is done away with. He has adopted this plan in twelve operations, where the grafts varied in size from 12 mm. to 50 mm. The vaseline interfered with the healing process in not a single case. Stress is laid upon checking all bleeding from the surface to be repaired before applying the graft. It is better to remove the grafts and delay until the surface is free from blood, even if that takes several hours, than to attempt to adjust the graft whilst oozing is taking place. The vitality of the graft is such that a short delay does no harm, but should this extend to several hours, and the grafts are small, fresh ones may be cut. Once in place, the graft should be disturbed as little as possible. If several grafts are required, they should be so arranged as to overlap one another slightly, as well as the skin margin. There must be no tension. Nothing, in his experience, delays the immediate result more than to leave small denuded areas between the grafts or at the margin of the skin. Over-correction of the defect should always be aimed at. As to dressing, Parker is a strong advocate of the "open-air method"—that is to say, he covers the grafted area with a suitably shaped plate of aluminium, freely perforated. The parts are dusted with aristol, and the aluminium shield is covered with gauze and held in place by strips of adhesive plaster. This method of dressing has been adopted by Parker in forty-two operations.

SYDNEY STEPHENSON.

16.—Trachoma.

(1) Dewey, Christian H.—Treatment of trachoma (second stage). *Ophthalmic Record*, April, 1914.

(2) Fox, L. Webster.—Trachoma and its treatment. *Ophthalmology*, July, 1915.

(3) White, Daniel W., and Cope, Peter. The surgical removal of the tarsal cartilage and palpebral conjunctiva in 402 cases for the prophylaxis, present and future elimination, and eradication of trachoma. *Ophthalmology*, October, 1915.

(1) **Dewey**, of Washington, in expression for trachoma, takes care to have the conjunctiva thoroughly anæsthetized by instilling a 4 per cent. solution of cocaine, followed by powdered cocaine applied on the everted lids with a dampened cotton wound applicator. He uses Prince's, Noye's, or Knapp's forceps for expression, and clears off any granules that have evaded the forceps by means of his trachoma burr. In slight cases the entire operation can be done with this burr. The conjunctival sac is afterwards flushed with warm boric lotion, or wiped clean, and some adrenalin and argyrol drops instilled. Hot fomentations are applied, and the patient kept in bed for an hour, and then he is allowed to go home.

The after-treatment is given as follows:—

Daily treatment for trachoma.

(1) Inspect conjunctiva and cornea for abnormal conditions.
(2) Flush eyes with warm, saturated solution of boric acid, or normal salt solution.
(3) When copper sulphate pencil is not used. Dust powdered boric acid on everted lids with cotton pledget. Use friction massage.
(4) When copper sulphate pencil is used. Instil one or two drops of 4 per cent. solution of cocaine. (For few weeks only.)
(5) Apply copper sulphate pencil; 1 per cent. yellow oxide of mercury ointment; 5 per cent. to 10 per cent. copper citrate ointment, or 15 per cent. thiocinamine ointment. If ointment is used, massage lightly.
(6) If copper sulphate pencil is used, flush out eye to remove excess of copper. (Pencil should be applied lightly to tarsal plate and fornices.)

First and second stages.—Mondays, Wednesdays, and Fridays, use yellow oxide ointment. Thursdays and Tuesdays, use copper citrate ointment. Saturdays, use copper sulphate pencil, also Wednesdays, if instructed.

Third stage.—Same as above, except on Wednesdays and Saturdays use thiocinamine ointment.

J. JAMESON EVANS.

(2) The chief object of this paper by **Webster Fox**, of Philadelphia, is to describe the *grattage* operation for trachoma, to which the author attributes great value. The palpebral conjunctiva and retro-tarsal folds are first exposed, this being facilitated by the use of Darier's forceps. The conjunctiva is then scarified with the three-bladed scarificator, and scrubbed with a tooth brush steeped in a 1 : 1000 solution of $HgCl_2$. After bathing with the same solution, cold compresses are applied. Fox says the results are very gratifying, and that one such procedure is usually sufficient.

For chronic trachoma with infiltration and thickening of the tarsus, extirpation of the tarsus and conjunctiva is recommended.

A. J. BALLANTYNE.

(3) **Daniel White and Peter Cope,** of Tulsa, Oklahama, base their paper on a personal experience of over 100,000 cases of trachoma among the Indians of the United States, and among many thousands of the white, and about 300 cases in the coloured population. They state that the amount of trachoma in Oklahama and the neighbouring States and territories is appalling. In Oklahama alone there are at least 80,000 cases among the Indians, and a large proportion of the whites is also affected. Medicinal treatment has been found quite inadequate to deal with this disease problem. On the other hand, the authors have obtained excellent results from the operation of removal of the tarsus and conjunctiva. The description of their operation is supplemented by a number of diagrams, and they report, in abstract, some forty illustrative cases. A. J. BALLANTYNE.

17.—Pericorneal Neurotomy.

Verhoeff, F. H. — Rosacea keratitis and certain other forms of marginal keratitis, neuropathic in origin. Treatment by pericorneal neurotomy. *Trans. Amer. Ophth. Society*, Vol. XIV, Part i, p. 89, 1915.

Verhoeff. of Boston, Mass., believes that the corneal lesions associated with rosacea are of neuropathic origin, due to impulses from the Gasserian ganglion passing into the peripheral zone of the cornea along the conjunctival nerves. The same remark applies to certain small peripheral corneal infiltrates associated with the lesions of herpes facialis. That these changes constantly occur at about a distance of 1.5 mm. from the limbus proves to Verhoeff that they are connected with the terminations of the conjunctival nerves in the cornea, although he has never been able to demonstrate any reduction in the sensibility of the periphery of the cornea in these cases.

For the relief of these several conditions Verhoeff performs a partial peritomy, for which he proposes the somewhat grandiloquent name of "pericorneal neurotomy." The conjunctiva is incised at the limbus with scissors, and then undermined with successive snips for a distance of 4 mm. or 5 mm. away from the limbus. Care should be taken to cut all tissue down to the sclera. Finally, the flap is re-adjusted by a suture at each end of the incision, as in the van Lint operation for cataract.

SYDNEY STEPHENSON.

18—Ptosis.

Calderaro.—Some modifications in the operation for ptosis. (Alcune modificazioni al processi di blefaroptosi.) *La Clinica Oculistica*, December, 1915.

The correction of ptosis, says **Calderaro,** it still one of the most difficult and delicate operations which the ophthalmic surgeon is ever called upon to undertake. In spite of the numerous methods which have been devised during the second half of the last century, the problem cannot yet be considered adequately solved.

We have, however, advanced so far as to recognise that no operation is satisfactory which does not substitute the action of one of the accessory muscles for that of the deficient elevator.

Calderaro has had good results from the method of Angelucci, by which the tendon of the elevator is attached to the frontalis, after division behind the tarsal plate.

He has, however, found it unnecessary in all cases to divide the tendon, and has in his later cases, merely pulled a loop of the tendon forward by means of a squint hook, and fixed this by sutures to the deep surface of the frontalis.

He has also devised a modification of Parinaud's operation, which seems well conceived and has given him good results.

The method essentially is the fixing, by means of a suture, of the levator to the superior rectus without interfering with the anatomical relations of either muscle to any serious extent.

Calderaro has selected the route through the conjunctiva as the more direct and easy. He has found cocaine give sufficient anæsthesia. After preliminary instillation of cocaine, he injects a further dose subconjunctivally from the scleral limbus to the adherent margin of the tarsus. The upper lid is everted and pulled upwards by means of a sharp hook fixed in the scleral border of the tarsus; the eye must be rotated forcibly downwards, by a fixation forceps placed on the corneo-scleral junction above. These must be held by an assistant. With scissors he makes an incision vertically from just above the cornea to the tarsus. He dissects the conjunctiva to either side and opens the capsule of Tenon, so as to lay bare the tendon of the superior rectus, which he picks up on a hook. The fixation forceps can now be discarded. On each side of the muscle, at a position varied according to the effect desired, a piece of catgut armed with a single needle is passed so as to take a firm hold on the muscle. The free end of the catgut hangs at the edge of the muscle, the armed end comes out above towards the middle line of the muscle. He then measures the distance between the point at which he has passed the suture and the junction of the upper and middle third of the cornea.

The next step is to lay bare the thin tendon of the levator which lies close under the conjunctiva of the fornix. He then measures a distance from the free margin of the lid on the tendon, equal to the distance found before, and passes the armed catgut at this point from the middle of the tendon, so as to emerge at a point corresponding to the point of exit of the free end of the catgut. Both should be passed before either is tied. Then the conjunctival wound is closed and the operation is over.

The author gives some illustrations of his results which appear very satisfactory.

H. [illegible] GRIMSDALE.

19.—Dislocation of the Lens.

Axenfeld, Th. **Spontaneous luxation of the transparent ectopic lens into the anterior chamber, especially in childhood, and its operative treatment. (Die Spontanluxation der durchsichtigen ectopischen Linse in die Vorderkammer, besonders im Kindesalter, und ihre operative Behandlung.)** *Klin. Monatsbl. f. Augenheilkunde*, [illegible]

Spontaneous luxation of the lens into the anterior chamber is rare in children. **Axenfeld,** of Freiburg i. B., finds only one case reported in the [illegible] are not completely detached, but some fibres of the zonule remain. This point is of importance in relation to treatment, for little wrinkles of the iris indicate where these fibres are drawn tense by the contraction of the pupil behind the lens, and eserine is not only useless in such cases, but may be actually harmful by increasing the tendency to occlusion of the pupil. Mydriatics, on the other hand, may allow reposition of the lens and fall of tension. The extraction of such lenses is difficult, since loss of vitreous cannot be avoided, and loss of vitreous is not well borne by the eye of the young. In one of his cases, the author, in making the corneal incision for extraction of the lens, split the lens itself at the same time. This allowed the lens substance to escape from its capsule, the latter being afterwards extracted by forceps. A preliminary iridectomy had been done. No vitreous was lost in this case. In some cases, Axenfeld would advise restoration of the lens to the vitreous ; indeed, he feels that there is no method of treatment which applies to all these cases ; each must be treated on its merits.

A. J. BALLANTYNE.

20.—Questions connected with Removal of the Eyeball.

(1) Schoute, G J.—Schmidt's bone prothesis. (Die Schmidtsche Beinprothese.) *Zeitschrift für Augenheilkunde*, January-February, 1915.

(2) Verhoeff, F. H.—A simple operation for contracted socket. *Ophthalmic Record*, March, 1916.

(1) **Schoute,** of Amsterdam, describes three cases in which he introduced Schmidt's bone spheres into Tenon's capsule. These spheres are turned from the cancellous bone of the head of the femur of the ox. They are incinerated until all organic material has been burnt away, and only a spongy mass of inorganic bone tissue remains. This is inserted into Tenon's capsule, the muscles are sewn over the capsule, and the conjunctiva is sutured. In all cases the stitches gave way, and the bone spheres became exposed. One case was lost sight of, but in the other two the bone spheres became fixed by granulations which sprouted into their cancellous tissue. The conjunctival defect was very slowly replaced, and eventually a glass eye was inserted. In one example this was done before the aperture in the conjunctiva had healed, and with no evil effect. The cosmetic result was excellent, the artificial eye moving so well that it was almost impossible to detect that it was not a real eye. T. HARRISON BUTLER.

(2) **Verhoeff,** of Boston, Mass., finds that he can depend upon a successful result with the following operation, no matter how great the contraction of the socket.—The orbital cavity is enlarged by dissecting away all the scar tissue, the palpebral fissure, if necessary, having first been enlarged by canthotomy. The dissection completed, the cavity is cleansed and a large glass ball, at least 18·5 mm. in diameter, is placed in it. The purpose of this is to check further bleeding. The skin having been smeared with sterile vaseline, as recommended by W. R. Parker, a Thiersch graft is cut from the inner surface of the thigh. The cut graft is spread upon a double sheet of Cargile membrane and applied to a glass ball of the same size as that in the orbit. The last-named is removed, and replaced by the prepared ball. Finally, the lids are closed, and both eyes bandaged. At the end of five days, the glass ball is carefully prised out and the Cargile membrane removed. The membrane, we are told, has no tendency to adhere to the graft. The glass

ball, after being cleansed, and covered with White's bichloride of mercury ointment, is replaced in the orbital cavity. A single bandage is applied. In two or three weeks from the time of operation, the glass ball may be replaced by an artificial eye. SYDNEY STEPHENSON.

21.—Detachment of the Retina.

(1) **Curtin, T. Hayes.—A new operative procedure in the treatment of retinal detachment.** *Ophthalmic Record*, February, 1915.

(2) **Higgens, Charles.—Detachment of the retina.** *Lancet*, January 29th, 1916.

(1) **Curtin**, of New York, has successfully treated a case of detachment of the retina by posterior scleral trephining. His method differs from that adopted by Parker and others in that it is performed in two stages:—(1) The scleral button (2 mm.) is removed from under a conjunctival flap over the site of the detachment, and the flap replaced and fixed by sutures. (2) After the flap has healed (about ten days) a medium-sized aspirating syringe is pushed through the conjunctiva and scleral opening made by the trephine, and the subretinal fluid aspirated. If the fluid re-collects, the aspiration can be repeated. The other advantages claimed for the method are:—(1) The small amount of traumatism; (2) no injury to retina or vitreous; (3) no marked reaction; (4) the fundus can be examined at the time of aspiration and the position of the retina observed. J. JAMESON EVANS.

(2) It is quite well known to oculists that **Higgens**, of London, is one of those who are pessimistic regarding the treatment of retinal detachment. This surgeon now reports two cases of retinal detachments, both of them traumatic, it must be noticed, occurring in presumably healthy soldiers. After a galvano-cautery operation in the manner recently recommended by Leslie Paton, the retina became completely re-attached in each case. In one case the visual acuity is recorded as J. 19 at one foot, in the other as J. 29 at one foot after the operation. Since both cases occurred in 1915 only, the permanence of the cure remains to be demonstrated, and one hopes for further information about them. ERNEST THOMSON.

22.—The Lacrymal Passages.

(1) Salva.—Obliteration of the lacrymal canaliculi. (Oblitération des canalicules lacrymaux.) *L'Ophtalmologie Provinciale*, mars, 1915.

(2) Gifford, H.—A method of destroying the lacrymal sac in chronic dacryocystitis. *Ophthalmic Record*, January, 1915.

(3) Pratt, J. A.—Intra-nasal drainage of the lacrymal sac: a simple method. *Ophthalmic Record*, April, 1915.

(4) Mosher, H. P.—An operation for draining the lacrymal sac and the **nasal duct into the unciform fossa.** *Laryngoscope*, November, 1915.

(1) **Salva**, of Grenoble, emphasizes the value of obliteration of the canaliculi in cases of epiphora, dacryocystitis, or hypopyon-ulcers of the cornea

complicated by lacrymal disease. He reports three cases and gives an account of the *technique* of the operation. The conjunctival sac is cocained and some cocaine injected in front of and behind the canaliculus. A fine-pointed galvano-cautery is inserted into the punctum, brought to a dull-red heat and allowed to remain for three or four seconds before withdrawing it. If the obliteration is not complete in four or five days, the canaliculus is recauterised or a ligature put round it. He holds that epiphora that is not caused by wind, dust, or foreign body, is due to the irritation of secretion from the lacrymal sac; he has found cauterisation of the canaliculi almost as serviceable as excision of the sac, and a simpler procedure. He rarely uses probes and then only the finest. He states that even in cases of purulent dacryocystitis, he has noticed no increase in size of the sac after obliteration of the canaliculi; he has rarely been obliged to open the sac. P. A. HARRY.

(2) **Gifford,** of Omaha, prefers to destroy rather than to remove chronically inflamed lacrymal sacs. Until some eight years ago he was in the habit of burning out the incised sac with a small Paquelin cautery. Since then he has replaced the cautery by chloracetic acid, which is less unpleasant to use under local anæsthesia, and not so likely to extend too deeply and lead to necrosis of the bone. His method of procedure is as follows:—

" Infiltrate the tissues well down to the sac with one or two per cent. cocaine combined with a little adrenalin.

" Incise the sac three-sixteenths to one-quarter of an inch inward from the caruncle, making a vertical cut one-quarter to three-eights of an inch long, including the greater part of the palpebral ligament. Be careful not to squeeze out the sac before incision, since a distended sac is naturally much easier to locate. When once in the sac it is well to introduce a grooved probe, and extend the internal incision with the angled knife to the full quarter inch or more. Then pack the sac with a piece of iodoform gauze. This should be a narrow slip doubled so that the part that goes into the sac has no loose fibres. After all bleeding is stopped and the cavity dried carefully with small cotton swabs on sticks, two or three drops of liquefied (full strength) chloracetic acid are put into the well-exposed cavity, and its interior (about one-eight inch in diameter) is then rubbed thoroughly by means of a small ball cotton swab on a slender metal rod, or a bulb-pointed lacrymal probe will do quite well instead of the ball swab. The cavity is again dried out and the cauterising process repeated. The cavity is then dried and syringed out with some cleansing solution and filled with aristol powder. Zinc ointment is applied to the skin edges of the wound, and a light moist or vaseline dressing applied. The operation may also be performed in two stages: incision and packing on the first day and application of the trichloracetic acid on the second day, after anæsthesing the interior of the sac with a few drops of ten per cent. cocaine and a few crystals of the same."

Gifford has " never exsected a lacrymal sac and has not the slightest intention of doing so." J. JAMESON EVANS.

(3) **Pratt,** of Aurora, Ill., uses the following instruments for his intra-nasal drainage operation:—(1) A canaliculus knife. (2) A number 13-14 Theobald lacrymal probe. (3) A dental or bone engine with right-angle handle. (4) Two burrs of 33 mm. length with cutting portion 2 mm. and 3 mm. in diameter and 6 mm. long, same to cut on end as well as side and to project 19 mm. from handle; 2 mm. and 3 mm. round burrs same length. (5) A septum knife.

The operation can be done under general or local anæsthesia. After cocainisation of the eye and nose, both puncta are dilated and probed to the sac. The sac is then injected with 10 per cent. cocain in epinephrin.

A canaliculus knife is then passed through the upper punctum down to the bottom of the sac, its handle is now turned down and an opening made in the upper part of the sac, at least 5 mm. long, so that a No. 14 Theobald lacrymal probe can be passed to the bottom of the sac. The nasal clamp is placed in position, so as to protect the septum from the burr. The burr (round 2 or 3 mm.) is now passed to the bottom of the sac, its shaft at an angle of 45° and pointing towards the opposite side of the chin. The engine is started, and by gentle pressure a hole is burred into the nasal cavity. Changing to the side-cutting burr, the hole is now enlarged up and down to a size of 8 mm. by 6 mm. The nose is then inspected, and any shreds are snipped off with cutting forceps. The sac is washed out, clots are removed, and a superficial suture is used to close the cut in the sac.

J. JAMESON EVANS.

(4) **Mosher** contributes a paper on drainage of the lacrymal sac into the nose and illustrates the anatomical points with numerous drawings. The anterior end of the middle turbinal is removed in the operation, so as to uncover the unciform fossa, and a mucoperiosteal flap is dissected downwards. The inner wall of the unciform (agger) cell is then broken down and the inner wall of the nasal duct and lacrymal sac slit open. The lip of the ascending process of the superior maxilla is removed to widen the aperture. It is necessary to avoid opening the maxillary antrum through the unciform fossa, as infection might be carried from the sac. If reopening of the canal becomes necessary, it is easily done under direct vision. WILFRID GLEGG.

23—Anæsthesia.

(1) Obarrio, P. de.—Local anæsthesia in surgery of the iris and lens. *Ophthalmology*, October, 1915.

(2) Illig, H.—Local anæsthesia in exenteration and enucleation of the eyeball, with novocain solution. *Archives of Ophthalmology*, Vol. XLV, Part 1, January, 1916. (Translated from *Archiv für Augenheilkunde*, Vol. LXXX, p. 23, 1915).

(1) **Obarrio**, of San Francisco, aims at a technic which will obviate (1) the dilatation of the pupil, (2) the pain, and (3) the bleeding from conjunctiva and iris, which accompany such operations as iridectomy and cataract extraction. On the night preceding the operation he instills some 1 per cent. atropine solution. Before the operation he applies a 2 per cent. solution of cocaine two or three times at one minute intervals, and also adrenalin. After making the corneal incision and draining off the aqueous, he injects into the anterior chamber by means of a small flattened canula two or three drops of a solution consisting of 2 per cent. cocaine, 2 parts, and 1-2000 adrenalin, 1 part. This renders the iris insensitive and prevents bleeding, while the dilatation of the pupil by atropine facilitates the extraction of the lens.

A. J. BALLANTYNE.

(2) **Illig**, of Munich, bases his remarks on an experience of 70 cases of the production of local anæsthesia for exenteration or enucleation of the eyeball. The solution used was as follows:

Novocain	0.0125
Potasssium sulphate	0.92
Adrenalin [illegible] ...	[illegible]
Sodium chloride solution (0.9 per cent.)	5 drops

2.5 cc. of this solution were injected nasally and temporally, after the conjunctiva had been rendered anæsthetic by cocaine. The subcutaneous injection of morphine or of scopomorphine was reserved for excitable and troublesome patients. A straight platinum-iridium needle, 4 cm. long, is used ; full directions are given to ensure the fluid being deposited in the near neighbourhood of the ciliary ganglion. After the completion of the injection, the patient was directed to hold his head well back, so as to ensure the fluid remaining in the posterior part of the orbit. The solution must be quite fresh. For ordinary operations the 0.3 per cent. strength of novocain suffices ; in exceptional cases solution of 0.4 to 0.5 per cent. may be used with advantage.

Illig has never seen any evil results from this operation, and the anæsthesia has been most satisfactory. The same may be said by most ophthalmic surgeons of their experience in these operations with a general anæsthetic. To the reviewer's mind, the great advantage of general anæsthesia lies in the fact that the patient knows nothing of the operation, and wakes to find that "everything is over." R. H. ELLIOT.

24.—Miscellaneous.

(1) Eaton, F. B.—The clinoscope as a guide to operative eye work, with an example. *Ophthalmic Record*, April, 1914.

(2) O'Connor, Roderic (Oakland, Cal.)—A buried knot conjunctival suture. *Ophthalmic Record*, March, 1916.

(1) **Eaton**, of Portland, Ore., complains of the timidity of his fellow countrymen in making practical use of the most important and beneficent of G. T. Stevens' discoveries, *viz.*, the clinoscope.

He gives a detailed account of the construction of a clinoscope made by himself, "with the help of a cabinetmaker and a tinker, who did some trifling soldering," but, "needless to say, this description is not needed by those who can see their way to purchase the superb clinoscope of Dr. Stevens."

The case described illustrates the instrument's value as a guide to correct surgery. J. JAMESON EVANS.

II.—REMEDIES.

(*Third Notice.*)

(1) Bérard. — Leucocytosis and polynucleosis in clinical work. (La leucocytose et la polynucleose en clinique.) *La Clinique Ophtalmologique*, janvier, 1916.

(2) Darier. A.—The treatment of infective ulcers of the cornea by ethylhydrocupreine. (Traitement des ulcères infectieux de la cornée par l'éthylhydrocupréine.) *La Clinique Ophtalmologique*, janvier, 1916.

(3) Lafont, A., Dupont, V., and Heckenroth, F.—Experiments in treatment by means of therapeutic sera, alone or associated. (Essais de traitement par les sérums thérapeutiques seuls ou associées.) *La Clinique Ophtalmologique*, janvier, 1916.

(4) Kerry, Richard.—Note on the use of iodine in diseases of the eye. *Ophthalmology*, January, 1916.

(5) **Hansell, Howard F.—A note on ethylhydrocuprein.** *Ophthalmic Record*, March, 1916.

(6) **Mason, Albert.—Report of a case of post-diphtheritic paresis of the external rectus cured by antitoxin.** *Ophthalmic Record*, March, 1916.

(7) **Quinine collyria.** *British Medical Journal*, March 25th, 1916, p. 472.

(1) In the translation of the article by Dutoit, which appears on another page, reference is made to an article by **Bérard**, in the same number of *La Clinique Ophtalmologique*, with regard to Novitase or Tapo, a leucocytosis producing ferment.

The article by Bérard, while it has nothing directly to do with ophthalmic work, bears upon the general subject of leucocytosis, and towards the end of the article the author makes special reference to the work of Massol. Massol turned his attention to microbic cultures which, in a medium suitable for their preservation in sufficient vitality, could be absorbed by the intestinal route, since it is in the intestinal tract that one finds the richest and most productive lymphoid organs. "The 'Tapo' cultures which Massol left, when he died, to his pupil and successor, Taponnier, chef du Laboratoire de Sérothérapie, at Geneva, provoke in the intestine an abundant leucocytosis, restore from the time of their administration insufficient polynucleosis, and in all the infections in which we have had occasion to adminster them have usually produced most energetic effects."

It will be noticed that here again, as in the article by Dutoit, there is a complete absence of detail as to the exact nature of this remedy, which one must assume to be of a proprietary nature. ERNEST THOMSON.

(2) We may be permitted to offer a welcome to the reappearance of *La Clinique Ophtalmologique*, which has been "out of action" during the past year, and to congratulate its editors upon their energy. It is a good omen.

The first article in this January number is by **Darier**, of Paris. The author, to begin with, sets down the conclusions to which he has come with respect to optochin* or ethylhydrocupreine, namely, that it has a direct chemiotherapeutic action on the pneumococcus; that this action is due to a specific bacteriotropism; that in order to avoid the tolerance which the pneumococcus soon exhibits to the drug, the treatment must be intensive; that the drug has a prompt prophylactic action; that *in vitro* it has an inhibitive action in a strength of 1 to 800,000 and a pneumococcicidal action in a strength of 1 to 400,000, while the staphylococcus remains uninfluenced; that both *in vitro* and on animals the pneumococcus soon becomes tolerant; and that in solutions up to 5 per cent. the drug produces no *lasting* alteration on the rabbit's eye, but causes in this animal anæsthesia of some duration, while in 1/2 per cent. solution subconjunctivally it destroys intracorneal pneumococci in twenty-four hours. Next, Darier relates eight cases of corneal ulceration, presumably proved to have been due to the pneumococcus, but while this is inferentially, it is not definitely, stated. Some of these cases gave very striking results under optochin treatment. The author refers to many other cases of infective ulcer, where no bacteriological examination could be made for want of staff and time, in which good results were obtained. A number of cases are also cited from the literature and the article concludes with a paragraph headed "Method of Use." This consists, as regards essential details, in (1) delimiting with fluorescein; (2) cleaning the surface with a curette, thereby obtaining material for examination; (3) taking up on a flame-sterilized probe a hardly visible grain of finely powdered optochin; (4) covering with the drug the whole surface of the previously cocained ulcer; (5) waiting ten minutes and then applying powdered dionine: (6) waiting several hours and then instilling 1 per cent. optochin every half-hour (for how long?); (7) introducing an optochin-atropine ointment, made with vaseline, and sending the patient home with an "occlusive dressing." "Intensive treatment," without doubt!

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* T[illegible]

ERNEST THOMSON.

(3) **Lafont, Dupont,** and **Heckenroth,** working in the Dakar Laboratory (West Africa), have employed various sera—even anti-plague serum, but especially anti-diphtheritic serum, not only as injections but also as dressings. The patients were, all but one, natives, and the diseases those of the conjunctiva and cornea, exclusive of trachoma. Sometimes the sera were employed alone, and sometimes along with other treatment. The authors were very favourably impressed with the results in the 49 cases treated. Case-histories are given in 22 cases. These may be studied in the original. It is worth noting that human serum was employed in 2 cases, and that in one of them severe anaphylactic phenomena occurred. Obviously, the conditions present were not suited for the carrying out of exact scientific observations, and the authors do little more than express their opinion of the beneficial action of the treatment. ERNEST THOMSON.

(4) **Kerry**, of Montreal, recommends the systemic employment of iodine in a whole host of eye diseases not readily amenable to the usual methods of treatment. Ten minims of "a 2½ per cent. solution of iodine in fatty combination" are hypodermically injected, once or twice a week, into the flank or elsewhere. He mentions the case of a diabetic patient in whom a spot of dry gangrene developed at the site of injection.

SYDNEY STEPHENSON.

(5) After reviewing the literature which deals with ethylhydrocuprein in affections of the eye, **Hansell**, of Philadelphia, reports the case of a child of three years suffering from a severe ulcer of the cornea after measles. The conjunctiva was inflamed, and the discharge showed a pure culture of pneumococci. Under treatment with weak sublimate, and a 1 per cent. solution of optoquin, the latter instilled into the affected eye every two hours, the condition speedily recovered. The child was discharged from hospital forty-eight hours after the treatment was begun.

SYDNEY STEPHENSON.

(6) The patient whose case is reported by **Mason**, of Waycross, Georgia, developed diphtheria faucium, for which three injections of antitoxin were administered. Eleven days later, paresis of one external rectus was observed. Four injections of antitoxin led to cure in seven days.

SYDNEY STEPHENSON.

(7) The following note upon quinine collyria was published among the notices to correspondents in a recent number of the *British Medical Journal*:—

"Quinine sulphate is only soluble in water to the extent of 1 in 800, therefore it is not possible to get a clear solution of 1 per cent. strength without the addition of acid, and if this were added the solution causes unnecessary pain. Quinine hydrochloride is soluble in water to the extent of 1 in 40; if, therefore, this salt be used, a clear bland solution of even 2 per cent. strength can be obtained. An even stronger and quite unirritating solution can be made by using the acid hydrobromide of quinine, which is soluble in water to the extent of 1 in 7. The hydrochloride is usually the more easily obtained. It may be added that cocaine has no curative value—in fact, aqueous solutions are injurious to the normal corneal epithelium, tending to cause exfoliation; consequently the healing of corneal lesions is delayed by its exhibition."

BOOK NOTICES.

The Royal London Ophthalmic Hospital Reports. Volume XX, Part ii. London: Adlard & Son and West Newman, Bartholomew Close, E.C. Price 7s. 6d. net. 1916.

This substantial number of the *Reports* commences with some historical notes concerning the Chevalier Taylor's son, Roger Grant, and the Chevalier Taylor's grandson, by the late George Coats. In addition, there are some most interesting observations (dating from the Bible) upon restoration of sight in those born blind, by the same author. H. E. Smith and C. H. Usher write upon "Choroideremia and two other varieties of night-blindness in the same pedigree"; Angus MacGillivray on "A bacteriological and clinical study of the external diseases of the eye"; R. Foster Moore on "The retinal detachments of renal retinitis"; and, lastly, Paul D. Berrisford (St. Paul, Minn., U.S.A.) on "Statistical notes of glioma retinæ, with a report on forty-one cases."

"The Description of an Ophthalmoscope," being an English translation of von Helmholtz's "Beschreibung eines Augenspiegels" (Berlin, 1851), and the first translation of this classic into any language. by THOMAS HALE SHASTID, M.D. Chicago: Cleveland Press, 1916.

The story of the invention of the ophthalmoscope affords an excellent illustration of the familiar fact that scarcely any of the great discoveries and inventions have been given to the world solely and entirely as the product of a single mind. There are always the pioneers who, consciously or unconsciously, have been making preparation for the great event. In the case of the ophthalmoscope the discovery seems to have been for a long time, as it were, hovering in the air. Before Helmholtz's time much study had been applied to the problem of intra-ocular illumination, and the principles had already been pretty completely demonstrated. Several observers had just missed a full anticipation of Helmholtz's discovery, and there is even some evidence that the English mathematician, Babbage, had succeeded in producing a practicable ophthalmoscope. But in any case, and whether Helmholtz was aware of the efforts of his predecessors or not, to him remains the entire credit of having set himself deliberately to produce an instrument for the examination of the fundus of the living eye, applying to the problem the appropriate physical principles, and of having overcome the technical difficulties and produced an instrument so perfect that it revolutionised the whole study and practice of ophthalmology.

The treatise, in view of its importance, is a model of brevity, the original volume comprising only some forty octavo pages, and it is much to be wondered at that it has never hitherto found a translator. Dr. Shastid deserves the best thanks of the profession for having produced this English translation of the classic. The result, on the whole, is admirable, and great care has evidently been taken to exclude misprints and other errors. One slip occurs on page 11, where the translation speaks of "an accidental observation by E. Brücke," the original being "an accidental observation of v. Erlach quoted by E. Brücke." The only general criticism we could offer is, that as Dr. Shastid, in his desire to take no liberties with his text, has made his translation an almost strictly literal one, he has often been forced, as is inevitable in a translation from German into English, into an awkwardness of expression which even tends at times to conceal the author's meaning. It is true that, as the translator points out, Helmholtz's literary style was not faultless, but that would seem to justify the abandonment of the literal method of translation where the author's meaning can be traced, although inelegantly expressed. In the most difficult passage of all, the translator, in a footnote, excuses himself from the attempt to elucidate ; but one would submit that a free translation, in the light of the context, would have helped to make the meaning of the passage plain. This sentence, in the original, does not seem so "hopelessly obscure" as Dr. Shastid suggests.

It would serve no useful purpose to refer to the contents of Helmholtz's treatise in detail. It is divided into four sections and an appendix, dealing respectively with the question of intra-ocular illumination, with the production of an image of the retina, with the description of the ophthalmoscope, with the method of employing the instrument and the appearances of the normal fundus, and with the mode of deriving one of his mathematical formulæ. There is one plate, illustrating the finished instrument and the optical principles involved in its construction.

Perhaps if Helmholtz, having designed his instrument, had left it to its fate in the hands of the ophthalmologists, the history of the ophthalmoscope, and of ophthalmology in general, would have been very different. But he carried his work much further ; indeed, to such a point that there could be no room for scepticism as to the practicability and usefulness of the instrument ; and not the least interesting part of the treatise is that in which he describes the appearances seen in the living eye—the optic nerve entrance, the veins and arteries (the latter distinguished by their lighter colour and double contour), the yellow spot, and the variations in the complexion of the fundus—as well as a method of roughly estimating the refraction of the eye. In scarcely any particular would this have to be modified if written at the present day. One cannot refrain from quoting the passage in which, modestly enough, Helmholtz suggests the future usefulness of his invention. "I have no doubt that one will be able to recognise all such disease conditions as permit of recognition by the sense of sight in other transparent parts. . . . Increased repletion of the vessels and vascular varicosities must prove easy to make out. Exudates into the substance of the retina, or between that structure and the pigment membrane, must yield themselves to observation. . . . If they lie in part before the retina, they will then enclose its vessels in a veil," etc. "In brief, I believe that I may hold the expectation not to be exaggerated, that all the alterations of the vitreous body and of the retina which, until now, have been found in cadavers, will also permit of recognition in the living eye—a possibility which appears to promise the most remarkable advances for the hitherto undeveloped pathology of this structure."

In two interesting footnotes the translator refers briefly to the history of attempts at ophthalmoscopy before Helmholtz, and to the more important modifications introduced by his successors. English readers, at any rate, will miss in the latter a reference to Morton's device for the rotation of the lenses, which is almost as great an advance on the Rekoss disc as that was on the interchangeable lenses of the earlier models. A. J. BALLANTYNE.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers the Editor does not hold himself responsible for any views expressed in this column.]

A METHOD OF ENUCLEATION.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—It is interesting to read the translation of a Method of Enucleation of the Eyeball (which is also a very efficient one) by Valude, of Paris.

Oddly enough, when acting as House Surgeon in the Glasgow Eye Infirmary seven years ago (1908-1909) I first saw the essentials of this operation carried out by Freeland Fergus—the only difference being that the circumcorneal conjunctiva was divided along with the other tissues as the eyeball was being removed from the socket.

Since then I have had the pleasure of seeing the same operation performed on several occasions by the same surgeon. A detailed description of this excellent method will be found in the *Archives of Ophthalmology*, Vol. XLIII, No. 6, 1914.

I, myself, have had the opportunity of making a slight modification of the same in two methods:

(1) As by Valude, with the exception of also dividing the insertion of the superior rectus in addition to that of the external rectus, before shelling out the eyeball, and (2), as by Fergus, with the same modification.

The only advantage that I derived from these methods was a less degree of hæmorrhage during the operation, although otherwise they were no more efficient.

Yours truly,

CRAIGPARK, BARRHEAD.
8th April, 1916.

WILLIAM GRIER, M.B., Ch.B., D.P.H.,
Clinical Assistant Glasgow Eye Infirmary.

NOTES AND ECHOES.

Deaths.

We regret to announce the death of Odillo Maher, ophthalmic surgeon to the Sydney Hospital, New South Wales, at the age of fifty-eight years. He was a native of Sydney. After spending some terms at the Sydney University, he proceeded to Ireland, where in 1881 he took the degrees of M.D. and Ch.M. at the Royal University. During his stay in London, he took the membership of the Royal College of Surgeons, and became house-surgeon to Moorfields Hospital. On his return to Sydney, Maher was appointed ophthalmic surgeon to the Sydney Hospital and to St. Vincent's Hospital, Sydney He was also examiner in ophthalmology in the Sydney University. His latest appointment was as a member of the consulting staff of the Military Base Hospital at Randwick, Sydney. The deceased leaves a widow and family to mourn his untimely loss.

We regret to announce the death, on April 14th, of Professor M. Straub, the widely-known ophthalmic surgeon of Amsterdam, at the age of 57 years. His body was cremated on April 18th. Professor Straub was well known in this country; where he enjoyed many friendships. He was present at recent congresses in London and Oxford. The address delivered by Professor Straub before the Oxford Ophthalmological Congress in July, 1912, was published in THE OPHTHALMOSCOPE, Vol. X, p. 618. It dealt with the doctrine of scrofulosis. Professor Straub's communications are known the

The deaths of the following American ophthalmic surgeons are announced by our contemporary the *Ophthalmic Record* of March last:

Michael F. Patterson, of Des Moines, aged 58 years.
Benjamin L. Millikin, of Cleveland, aged 64 years.
Eric S. Wisehart, of Snow Hill, Md., aged 28 years.
Ephraim S. Evans, of Columbus, aged 76 years.
Melvin E. de Groat, of Alva, Okla., aged 51 years.
Henry Eastman, of Pittsburg, aged 45 years.
Henry M. Jewett, of Providence, aged 56 years.
Charles S. Crane, of Grand Forks, S.D., aged 53 years.
Alexander G. Sinclair, of Memphis, aged 73 years.
Eugene W. Beebe. of Milwaukee, aged 75 years.
George Suttie, of Detroit, aged 63 years.

* * * *

Proposed Ophthalmic School in Glasgow.

WE have been favoured by the Clerk to the School Board of Glasgow with the statement that "at a meeting on 9th March ult. the Board remitted to the Committees on special schools and on medical inspection of scholars jointly to consider and report as to providing classes for children of school age having defective sight and myopia."

The School Board of Glasgow is to congratulated on the step which it proposes to take. Such special classes are the natural outcome of the experience gained through the adoption of medical inspection and treatment of school children. To an urban education authority the problem seems relatively simple. Greater difficulties must arise in the case of education authorities who have to deal with rural or mixed urban and rural areas. Unfortunately, the popular idea that the rural scholars do not suffer much from defective sight is by no means accurate, so that sooner or later, special classes are likely to be developed in rural as well as in urban areas.

* * * *

Study in Europe.

WE gather from a recent number of *Ophthalmic Literature*, edited by Edward Jackson, of Denver, some interesting facts concerning the German Universities. During the summer semester of 1915, there were registered in the Universities 1,305 students from outside countries, as compared with 4,750 for the previous summer. Of that number a few came from countries at war with Germany, as Russia 62, Italy 5, England 2, and Belgium 1. The majority, 1,042, however, were derived from Germany's allies or trom neutral countries. From America the number registered was 128 as against 298 in 1914. *Ophthalmic Literature* urges that the United States offers far more than Germany, when one considers its larger population, its greater admixture of races, and its far wider variety of climate. But, as it points out, what is needed in America is the social and institutional organisation to render the material accessible for the education of students.

* * * *

Trachoma in America.

THE United States Public Health Service has established five hospitals for the treament of trachoma in the three States of Kentucky, Virginia, and West Virginia. In the past fiscal year 12,000 cases have been treated, most of which have been cured; those in which a cure was not effected were so far improved as to remain harmless to other people. In addition to the hospital work, doctors and nurses have visited patients at their homes and given instructions as to the means of preventing the development and recurrence of the disease. Surveys were made in sixteen counties in Kentucky, especially among school children. Of 18,016 persons examined, 7 per cent. were found to have trachoma. Similar inspections in certain parts of Arizona, Alabama, and Florida showed that from three to six in every hundred children were affected.—*British Medical Journal*, April 1st, 1916.

* * * *

Mr. Edgar A. Browne.

OUR popular colleague, Mr. Edgar A. Browne, of Liverpool, has recently received the congratulations of his professional friends on attaining his jubilee as a member of the Liverpool Medical Institution.

* * * *

Captain H. B. Cunningham.

WHEN the name of Captain H. B. Cunningham appeared in the official list of wounded, it was supposed that the well-known ophthalmic surgeon of Belfast was the person concerned. It now appears that the notice had reference to Captain Hugh Boyd Cunningham, of Sunderland, who prior to the outbreak of hostilities practised in that town as an ophthalmic surgeon and held the appointment of surgeon to the Durham County and Sunderland Eye Infirmary. We are glad to learn that the wound was but slight, and that the recipient is now on duty again.

* * *

Ophthalmological Society of the United Kingdom.

READERS are reminded that the next Annual Congress of the Ophthalmological Society will be held on May 4th, 5th, and 6th, under the presidency of Mr. Walter H. H. Jessop. The meetings will take place at the Royal Society of Medicine, 1, Wimpole Street, W., and the clinical meeting will be at the Central London Ophthalmic Hospital, Judd Street, W.C. During the Congress a collection of drawings, specimens, etc., will be on view in the Bowman Library at the Royal Society of Medicine. Those desirous of exhibiting should communicate with Mr. M. S. Mayou, 30, Cavendish Square, W.

Arrangements have been made with the Welbeck Palace Hotel, W., whereby members can be accommodated at the rate of twelve shillings and sixpence a day (bedroom, bath, breakfast, lunch, and dinner). There will also be a reception room open for members at the Welbeck Palace Hotel, and a lunch will be served in that room daily for members and their friends at two shillings and sixpence a head.

THE OPHTHALMOSCOPE DIARY.

	1916.	
Ophthalmological Society of the United Kingdom.	May 4th, 5th, & 6th	London.
American Ophthalmological Society.	May 9th & 10th	Washington, D.C.
Midland Ophthalmological Society.	June 6th	Eye Hospital, Cheltenham.
Royal Society of Medicine: Section on Ophthalmology.	June 14th	1, Wimpole Street W.
Oxford Ophthalmological Congress.	July 13th & 14th	Keble College, Oxford.
American Academy of Ophthalmology and Oto-Laryngology.	Dec. 11th, 12th, & 13th, 1916	Memphis, Tenn.

THE
OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. XIV.—No. 6.] *JUNE 1, 1916.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATION.

OPHTHALMIC OCCUPATIONAL AFFECTIONS, AS DESCRIBED BY PROF. RAMAZINI, OF MODENA AND PADUA, AT THE END OF THE SEVENTEENTH CENTURY.

BY

J. GRAY CLEGG, F.R.C.S.

MANCHESTER, ENGLAND.

BERNARDINI RAMAZINI was born at Capri in November, 1633. He was appointed professor of the theory of medicine in the University of Modena about the end of the seventeenth century. While there he had prepared a "Treatise on the Diseases of Tradesmen," which he published immediately after being installed as Professor in the University of Padua. He died of apoplexy in November, 1714.

His work was translated into English by Dr. R. James, and published, along with a translation of a pamphlet on "Endemial Distempers;" by Frederic Hoffman, Physician to the King of Prussia. The second edition of the English translation appeared in 1740, and the full title of it is as follows:—

Health Preserved,
IN TWO
TREATISES.

I. On the Diseases of ARTIFICERS
which by their particular Callings
they are most liable to.

With the Method of avoiding them, and their
Cure.

By BERN. RAMAZINI, M.D.
[illegible]

II. On those distempers, which arise from
particular Climates, Situations, and
Methods of life.

With Directions for the Choice of a healthy Air,
Soil and Water.

By FREDERICK HOFFMAN, M.D.
[illegible]

[illegible]

By R. JAMES, M.D.
[illegible]

The SECOND EDITION

[illegible]

I have gone through the whole of Professor Ramazini's book, and culled practically everything bearing on the eyes. I believe this work to be one of the earliest dealing with occupational diseases, and it is remarkable in its wide scope and thorough description. It is quoted in a treatise by C. Turner Thackrah, of Leeds, published in 1832, and entitled "The Effects of Arts, Trades, and Professions."

Diseases of Metal-diggers.

The first chapter deals with Diseases of Metal-diggers.

He says: Since the eyes are signally injured by the mineral steams, the mineral kingdom must likewise be consulted for a remedy to that misfortune.

By the use of internal minerals, Horstius cured an ophthalmia arising from metallic fumes, and eluding all external remedies. But at the same time collyria made of the scales or offal of brass are much commended; even the ancients were apprised of their virtue; for it is asserted by Macrobius, that those who work in brass-mines have always strong and sound eyes, by reason of the drying virtue, as he calls it, that is inherent in the brass.

With the same view does Homer give the brass the title of *Νωροπα χᾳλκον*, and Celsus allows the preference before all others to Cleon's collyrium of the scales of brass, with saffron, and spodium or putty. To these collyria you may add nitre, for Pliny affirms that in saltpetre mines the workmen are not weak-eyed, and the observations of later authors confirm his testimony. Upon the whole, we may lay down this for a standing truth, that the most proper and effectual remedies for defeating metallic diseases are generally to be obtained from the mineral kingdom; and, indeed, the conduct of nature in this point is very provident in furnishing a cure from the same quarter which produces the disease.

Diseases of Gilders.

In his chapter "Of the Diseases of Gilders," he says: I had occasion myself not long ago to see a young man, a gilder, who died after two months confinement to his bed, having taken too little care to avoid the mercurial exhalations. For they threw him at first into a cachectic habit of body; after that his face became wan and of a cadaverous complexion, his eyes swelled, his breathing became difficult, his mind stupid, etc. And after all, this man died without any feverish symptom.

Fernelius, in like manner, mentions the case of one whose brains melted and ran out of his eyes for several years without a fever; and who died at last, but had formerly suffered a mercurial inunction. And the same author ingenuously acknowledges that he could not but wonder how it came about that this man was never feverish. But in his second book, he seems to offer some reason why mercury quells a febrile heat.

Diseases of Surgeons.

In Chapter iii he treats of the Diseases of Surgeons, and others employed in friction and inunction for venereal cases.

Frambesarius acquaints us that a surgeon, upon anointing a pocky person with the usual ointment, was seized with a continual vertigo and dimness of sight.

Ramazini then proceeds: For my part, I can think of no cautionary method so proper and so effectual for those employed in such inunction, as that of a surgeon of our country, who finding to his cost that the danger and trouble he underwent surpasses the profit, and having experienced by frequent loosenesses, gripes and salivations, upon his own person, that such inunctions were more afflicting to him than to the persons anointed, did thereupon alter his course, and continuing to prepare the mercurial ointment as before, and to stand by the patient while the friction was performed, ordered the patients to rub themselves with their own hands; by which means a double advantage is gained; for not only the surgeon avoids danger, but the patients thus heating themselves by the motion and exercise of their arms, make the ointment penetrate the better; and withal have no reason to apprehend any danger to themselves from the remedy, in which they place all their hopes of relief.

Diseases of Chemists.

Dr. Ramazini deals with the Diseases of Chemists:—

Though the chemists boast of the art of subduing and fixing all minerals, yet they themselves cannot escape free from their pernicious influence; I was acquainted myself with our Carolus Lancelotus, a chemist of some note, but a trembling, blear-eyed, toothless, short-breathed, rotten fellow, whose very looks derogated from the fame and repute of the cosmetic medicine which he used to sell.

On the Diseases of Potters.

Those who sit at the wheel, and form the vessels by turning it about with their feet, are apt to have a swimming in the head, if their eyes are otherwise weak; and often the over-tiring of their feet makes them subject to the sciatica, etc.

Diseases of Brimstone Workers.

In Chapter ix there is a Dissertation of the Diseases of such as work upon Brimstone.

As sulphur answers the convenience of life in several instances, so it causes no slight disorders in those who boil or melt it, or make use of it in their work. Those who use melted or kindled brimstone fall into coughs, hoarsenesses, shortness of breath, and a running in the eyes.

The analysis of sulphur shows that it consists of double substance, one pinguious and inflammable, and the other acid and apt to extinguish fire. Now when sulphur is melted over a fire, and much more when it is kindled, this volatile acid arises in fumes which being received at the mouth, give rise to the above-mentioned disorders, and particularly to the cough and soreness of the eyes; for the soft and tender structure of the lungs and eyes is signally injured by the pungent acid.

Of the Diseases of Blacksmiths.

Daily experience vouches that blacksmiths are likewise blear-eyed; which, as I imagine, is not so much owing to the violence of the fire upon which their eyes are almost always fixed, as to the sulphureous effluvia which exhale from the hot iron, and strike or twitch the membrane of the eyes, so as to cause an expression of lymph from their glandules, with a blearedness, and often an inflammation or ophthalmia. It stands in the records of time that Demosthenes's father was a blacksmith; and him, Juvenal describes as being blear-eyed. However, there being a great quantity of sulphur lodged in the substance of the iron, it is no wonder that, while the iron is fining, the thin sulphureous particles fly out both from the iron and the fire, and, like sharp stings affect the membranes of the eyes, so as to cause sharp rheums and inflammations. I have met with many blacksmiths who complained of such disorders, for which I used to prescribe the application of milk and barley water, and such like temperating things; and bleeding, if the inflammation be great.

Of the Diseases of such as work in Lime and Plaster of Paris.

New lime, just taken from the lime-kilns, burns and exerts a fiery force. Besides, there is nothing which, after burning, retains the seeds of fire longer than lime-stone; for if you keep it a year in a dry place, and then dilute it with water, it smokes and exerts the latent fire in setting the water a boiling. In progress of time, as it smoulders and grows old, it loses a great part of its igneous force, and consequently is then less hurtful to the workman; though it always retains a corrosive acrimony which stimulates the throat and eyes, and makes the voice rough, but is easily repulsed and subdued by drinking cold water, and the emulsions of melon seeds and the cold seeds.

Diseases of Cleansers of Jakes.

Chapter xiv is entitled—Of the Diseases of the Cleansers of Jakes.

I am here in some doubt whether the physicians, who value themselves upon a neat and clean appearance, will not take it ill, that I carry them from the apothecaries' shop, which smells for the most part of perfumes, and where they deal as in their own province, to take a view of the houses of office. But considering they do not think it beneath them daily to inspect the excrements of the bladder and the belly, in quest of the disorders of the body, they ought likewise to allow of the inspection of these places, where such excrements are laid; and so give us leave to take a view of the diseases of those who are employed to cleanse them.

Since therefore, in our present age, medicine is reduced to the principles of mechanism, I shall not be ashamed of an acquaintance with the states and conditions of the meanest tradesmen, having nothing more at heart than the discovery of the truth. The accident, from which I took occasion to write this treatise of the diseases of tradesmen is as follows:—

In this city, which is very populous for its bigness, and is built both close and high, it is usual to have their houses of office cleansed every third year; and, while the men employed in the work were cleansing that at my house, I took notice of one of them who worked with a great deal of anxiety and eagerness, and, being moved with compassion, asked the poor fellow, why he did not work more calmly and avoid overtiring himself with too much straining? Upon this the poor wretch lifted up his eyes from the dismal vault, and replied, "That none but those who had tried it could imagine the trouble of staying above four hours in that place, it being equally troublesome as to be struck blind." After he came out of the place I took a narrow view of his eyes, and found them very red and dim; upon which I asked him, if they had any usual remedy for that disorder? He replied, their only way was to run immediately home, and confine themselves for a day or two to a dark room and wash their eyes now and then with warm water; by which means they used to find their pain somewhat assuaged. Then I asked him if he found any heat in his throat and difficulty of respiration, or headache? And whether the smell affected their nose, or occasioned a squeamishness? He answered that he felt none of those inconveniences; that the only parts which suffered were the eyes, and that if he continued longer at the same work, without interruption, he should be blind in a short time, as it had happened to others. Immediately after that he clapt his hands over his eyes and run home.

After this I took note of several beggars in the city, who, having been employed in that work, were either very weak-sighted, or absolutely blind. Now I do not wonder that the tender structure of the eyes is offended by such an ugly exhalation.

Ballonius relates the case of a poor workman, at Paris, who had sore and weak eyes, the cause of which he imputes to his trade, for he used to cleanse the streets from dirt. But I ever was, and still am at a loss to form a solid reason why the eyes are the only parts that suffer in such cases, and how the soft textures of the lungs escape, as well as the brain, which one would think might easily be affected by the steams reaching the nostrils.

I am of the opinion that the steam arising from such places, when stirred, is a volatile acid. And yet only the eyes are affected by such effluvia. I doubt if the curious will be satisfied with this solution of the matter—that as some poisons bear a peculiar antipathy to certain parts of the body, cantharides to the bladder, and the cramp-fish to the nerves, so these steams arising from the human ordure, after three years lying, assume a particular nature which injures the eyes only, and is inoffensive to the other parts.

For my own part I cannot rest satisfied in this solution, and therefore do not offer it as an argument of due weight and solidity.

He then produces arguments which leads him to the conclusion that there are special irritants which act where the serum of the blood alone is not their vehicle, but where also phlegm, the blood, and the pituita, which mixture pall their force. In pursuance of this notion it may be more reasonable to offer that the steam of the jakes do with their thinnest and sharpest particles gall the eyes, these being the most obvious parts, and possessed of the most exquisite sense ; and thus forcing out the lachrymal juice, join with it so as to form a new substance which is noxious only to the eyes, and not to the other parts which do not afford the like juice.

Whatever be the cause and manner of these steams, by which they affect the eyes more than the other parts, it is certain that the eyes are, by their natural constitution, equally ready both for susception and emission. That blearedness is infectious, and that a sound eye receives the morbific effluvia from the bleared eyes of another, is plainly made out by experience, and affirmed unanimously by the leading men of our profession.

In like manner that bewitching, which is said to be performed by a cast of the eye, seems to be brought about by a bright emanation from the eyes of the enchanter, which insinuates itself into the eyes of another, and being somewhat allied to it, and thus infects them.

This is not a place for enquiring further into the eyes, so I shall only stay to quote a noble passage out of Plato. He brings in Socrates, unfolding the meaning of that famous inscription in the entry of the Delphic Temple : " Have you not observed," says Socrates to Alcibiades, " that the face of a man looking upon the eye of another is in the most prominent part, or the pupil, of that other's eye, exhibited as in a glass? Thus the eye at last gets a view of itself when it on all hands looks on another eye, but is particularly careful to observe that which is best in the eye, and that by which itself sees : an eye, therefore, to perceive its own picture must look upon another eye."

To return to our subject.—The cleansers of jakes being of necessary use to all cities, it is but reasonable that the art of physic should provide some relief for them, especially considering that the civil law was so favourable to them as to prohibit the offering of the least injury to them, even though they should penetrate into another man's house. I have advised them to put transparent bladders over their faces, as those do who polish red lead, or to spend less time at once in cleansing the jakes ; or, if their eyes are weak, to leave that business, and apply themselves to some other trade, for fear of being obliged, for the sake of sordid lucre, to lose their eyes, and so beg their bread. Experience itself has taught them, and indeed it is agreeable to reason, that keeping within a dark room is very proper, as well as washing the eyes with warm water, which mitigates the heat of the eyes and lessens the pain, which, like a thorn pushed in, occasions the contraction of the nervous parts, and consequently an inflammation. If the eyes are very red, and there is ground to apprehend a true inflammation, I order bleeding, and as soon as the heat of the eyes is a little abated, I advise them to wash them with Muscadine wine, which in this case is an excellent remedy. For it invites, in a manner, the animal spirits to come from the brain and the optic nerve to return to the eyes, from whence they had been driven by the sordid and penetrating damps.

Of the Diseases incident to Oilmen, Tanners, and other such trades.

The *Acta Haffniensia* relates the case of a woman, who, by working hard in making candles for the market, was seized with a violent pain in the head, with a giddiness, a redness in the eyes, and a difficulty of respiration.

Of the Diseases of Nurses.

Nurses are subject to weakness of the eyes, headaches, a giddiness in the head, a difficulty of breathing, and the fluor albus, especially if they suckle for several years.

Of the Diseases of Bakers and Millers.

The particles of the flour or meal, which adhere to the eyes, pinch them very much, and often occasion a blearedness.

Millers and grinders come into the same list with the bakers; for the particles of fine flour fly about and fill the whole mill, so that in spite of their teeth, their mouth, nostrils, eyes, ears, and indeed the whole body is covered with meal.

The antients had not such machines for grinding corn as we have, by the help of waterfalls which turn great wheels about. They used to grind their corn in pistrina, which are now used for bruising and taking the husks off grain. Their wheels were turned not only with cattle, but with men, and slaves, and women. And from thence rose the name of handmills, because they turned them round with all their force. Criminals were commonly condemned to this work at the pistrinum: and we see in Plautus, there was nothing more frequent, nor so ominous to slaves, as the word pistrinum. L. Apuleius says; "He was made an ass, tyed to a mill with his face covered, and forced to tread over his own footsteps." We read in sacred writ, that Samson had his eyes put out by the Philistines, to qualify him for the turning of a mill (which was probably a handmill), for they used to put out the eyes of such as were doomed to this service, to prevent their being giddy.

Of the Diseases of Sifters and Meters of Corn.

The throat, the lungs, and the eyes sustain no small damage by the powder and rotten dust, for it stuffs and dries up the throat; it lines the pulmonary vessels with a dusty matter which causes a dry and obstinate cough; and it makes the eyes red and watery. The workmen employed in those services used to cover their mouths and nostrils with handkerchiefs, to keep out the dust, and to wash their throats and eyes often with cold water; but all this caution is not sufficient to indemnify them.

The Jews, and particularly the vulgar sort, are accustomed to sedentary and standing trades. Sewing, and fitting up old clothes is an employment they always follow, but their women, whether maids or married persons, gain their livelihood by their needle more than any other women whatsoever. This employment strains the eyes very much; for the women sit at it, not only all day, but even late at night by a very faint light, such as funeral lamps generally cast; and thus they not only undergo all the disadvantages of a sedentary life, but in process of time contract such a weakness in their sight, that, by that time they are forty years of age, they are short-sighted. Add to this, that in most cities the Jews live in narrow lanes, and their women have a custom of standing at the windows in all seasons of the year to take advantage of the light; by which means it comes to pass, that they suffer various disorders in the head, such as head-aches, pains of the ears and teeth, a dull heaviness, a hoarseness and blearedness of the eyes.

I would advise the women, especially those who follow the sewing trade so close, to spare some hours now and then for the sake of their healths; and to ease both their hands and their eyes, for fear the loss of their eyes should afterwards oblige them to an idle and a miserable life.

Of the Diseases of those who work on Minute things which strain the Eyes.

There are some tradesmen employed in the finer and smaller sort of workmanship, such as goldsmiths, watchmakers, painters, I mean those who paint upon jewels, and writers, such as he who wrote Homer's Iliads in the compass of a nut-shell, as Tully informs us.

The misfortune entailed upon those men from their business, besides the inconveniences of a sedentary life, is that common disease of the eyes called myopia, in which the objects are not seen unless they be placed near the eye; and accordingly we see most of these tradesmen use spectacles at work. Wedelius makes mention of this sort of tradesman in a particular manner, and says, they are weak-sighted, because it is usual for the parts which are most exercised to be most weakened. But we may draw a better reason for this weakness of the eyes from the principles of the optics.

I was always of the opinion, that nothing can illustrate the manner of vision, but a dark room, in which the images of external things are represented upon a white linnen cloath; which thought we owe first to Platerus, and then to Plempius in his Ophthalmographia. For if we place a convex glass in the hole of a dark room, the nearer the object approaches to the hole, the further must the cloath be removed from the aperture, to make a distinct representation of the object; and, on the other hand, the further the visible object is removed, the nearer must the cloath be brought to the hole, otherwise, the representation will become confused; for the distinct images of things are drawn, as it were, with a pencil only in the point where the rays join. From hence it appears, that the eye, which is of a finer and more admirable structure, cannot distinctly see objects at a distance, and near at hand, unless it be moveable, and apt to change its figure; so that, either the net-like coat, or the chrystalline humour, may be easily moved. Common experience teaches us, that, when we view objects at a distance, and do not perceive them clearly, because the rays, entering the eye almost parallel, meet too soon behind the pupilla, we can by straitening and contracting the eyes, by the means of the muscles and eyelids, so alter the figure of the eyes as to have a clear and distinct perception of the objects, which otherwise we saw but confusedly.

Now, those who work all day long upon very fine and small work, cannot have a distinct view of the minute objects before them, without keeping their eyes very steddy and intent, and fixed with a tonical sort of motion, or a motion always directed to one point; and consequently, though their eyes are naturally moveable, that being a necessary quality for perceiving objects at a distance, as well as near at hand, yet, by keeping the eye constantly in this one position, they contract such a habit that the retina being inured and accustomed to one form and figure, persists in it, and cannot be moved at pleasure for the perception of remoter objects. And it is for this reason that such tradesmen are almost all of them troubled with myopia.

Add to this, that, while the eyes are kept immoveable, and perpetually fixed upon one point and the humours grow thick and lose their transparency along with their fluidity, which gradually make way for a weakness of the sight; so that, though such tradesmen may have nimble and clear-sighted eyes, they may become short-sighted in process of time.

So great is the calamity entailed upon this sort of work, and the finest pieces of workmanship, such as clocks and watches, are so apt to produce this weakness of the eyes, that many of the workmen are almost blind before they arrive at old age. I know a woman in this city who had a peculiar way of stringing of pearl, and that so artificially as to cover their blemishes, if there were any, and by this means she got a great deal of money. But when she came to be forty years of age, finding no manner of relief from spectacles, she was forced to leave off the business. I remember, likewise, to have heard several printers complain that they have given a considerable shock to their eyesight by composing small types.

In earnest, I do not see how we can afford any relief to the workmen we now treat of; for it is not easy to persuade them to leave a beneficial and lucrative trade; and physic is unprovided with any remedy which can restore the primitive strength and mobility of the eyes, after the disorder is become inveterate; for neither purging, nor bleeding, nor the other medicinal means can take place in this case in regard the patients are otherwise well and brisk, and their spirits being neither clouded nor incrassated, it would be improper to punish an innocent and sound head with the commotions of medicines.

However, I would advise such workmen not only to use spectacles, but to intermit from their work now and then, and refresh their eyes with diversity of objects. For we cannot imagine how much the mobility of the membranes of the eyes and the native humours is kept up by viewing different objects, some near at hand, some remote, some directly, others obliquely, and, in fine, all manner of ways; for by this means the natural disposition of the eye is preserved, so that the ball is sometimes furled or contracted, and sometimes dilated; and the chrystalline humour approaches more or less to the pupilla, according to the remoteness or nearness of the object requires. Without this diversity of action, the eyes undergo the same fate as the other parts, which, by being long detained in one position, grow stiff and unfit for motion. Of this we have a manifest instance in those who, upon coming out of dark prisons where they have been long kept, are forced to accustom their eyes gradually to the light, because the pupilla or ball of the eye having been long dilated and its elastic spring weakened, it forgets, in like manner, how to contract itself as it used to do.

Of the Diseases of Husbandmen.

But as Husbandmen follow various sorts of work, according to the diversity of the country, and the seasons of the year, they used to be troubled in winter and the beginning of the spring, with the diseases of the breast, defluxions upon the eyes, and quinsys.

I have made one remark, which is curious, in our farmers' families, especially in their children; which is, that these children, being for the most part under ten years of age, are seized about the vernal equinox, with such a dimness in their sight, that they run up and down all day long as if they were blind; but, upon the approach of night they see very well. Now this disorder goes off of itself, without the assistance of any remedy; for about the middle of April, they become as well as ever. Upon such occasions, I have often taken a narrow view of these children's eyes, and found the pupilla, or ball, much dilated, which disorder the physicians call by the name of Mydriasis, though authors differ in their thoughts of the cause of it, as you may see in Sennertus, Riverius, and Platerus.

Gorreaus says, this distemper is not much different from the resolution of the pupilla; and indeed it seemed to me, that the rays of the sun in March, might make some colliquation in the brain and optic nerves, by which the means the tone and the spring of the coat, called Uvea, may be so resolved, that it becomes flaccid.

These children live all the winter in very hot and moist huts; and when the winter is broke, that is, about the vernal equinox, they peep out of their dungeons, and expose their bare heads to the sun-beams, upon which a fusion and colliquation of the humours may readily ensue; and from thence proceeds the dilatation of the eye-ball, and a weakness of sight, by reason of the admission of an excessive quantity of light; but, towards the end of April, the sunbeams being more effectual, discuss the humours which had just fallen upon the coat; and, the pupil being restored to its natural tension and lightness, the eye sight is recovered without the intervention of remedies.

Of the Diseases of Learned Men.

They likewise contract a weakness of the sight by degrees, for they cannot read and write with an intent posture of the eyes without injuring the sight, especially if they write small, as quick-witted men commonly do. Aristotle has a curious conjecture enough, if it were but true, upon the question why pur-blind persons usually write small letters. "It is strange," says he, "that those who are dim-sighted should do that which the sharpest-sighted ought to do." For this practice of pur-blind persons he brings several reasons, and so does Plempius, who says, "He has sometimes doubted whether it was only a sort of affection in such people as he thought quick-sighted." But I know a great many such who write their letters large enough, though it is not to be doubted but that those who accustom themselves to write small and fine grow thereupon shorter-sighted, and by degrees contract a myopia. For by that means the eye is accustomed to see only such objects as approach near to it, and by virtue of that custom the retina is confirmed, and hardened in a remoter situation from the pupilla, and so the eye is robbed of the mobility which nature gave it.

Sometimes those who read and write much are troubled with the disorder which is opposite to a myopia; so that in process of time they cannot see unless the object be held at a distance from them. And this is familiar to old men, for since they write and read with their head and body bended forward, the crystalline humour readily falls forward towards the pupilla, and stops it up so as to cause a blindness. Hence, Platerus gives this as the reason why horses and other brutes are under disorders of the eyes more frequently than men, because as they go with their faces bowed to the ground the humours of the eyes are gradually carried forward, and there they settle.

Of the Diseases of Printers.

The Compositors also, by having their eye perpetually fixed on the black types, contract a weakness of sight, and become subject to cataracts and other disorders of the eyes. I know two brothers, printers, with eyes naturally large and prominent, who were forced to quit the business, lest they should become blind. I also remember, that by sitting some hours with a printer in order to correct some work of my own, when I went out of the printing house, I perceived the types, as it were fluctating before my eyes, and even in the night-time had the images of them represented to my imagination, because I had viewed them so long and with so much attention. By having the eyes continually fixed then upon the black types, whether in composing or distributing letter, the tone of the membranes and fibres of the eye, and especially of the pupil, is greatly weakened, so that it is no wonder printers should be subject to disorders of the eyes.

The compositors themselves inform us that when they come abroad at night, after working the whole day, the images of the types seem to be imprinted on their imaginations, and there remain some hours, till they are effaced by the representations of other objects

Compositors ought also to use spectacles in order to preserve the tone of the eye, to turn their sight frequently off the types, and gently rub their eyes, in order to rouse their languid spirits, and to wash them with water of eye-bright and others of a like nature.

Of the Diseases of Confectioners.

The conditions induce upon confectioners violent disorders of the brain, breast, and eyes, for the head is afflicted with a violent pain, the eyes are often inflamed and prick'd as it were with darts, by the exhalations of the fire, and respiration is injured by the acrid particles contained in the inspir'd air. Confectioners ought therefore, if possible, to work at their business in an open place, for the dissipation of the corrupted air, and so spend some hours a day in taking the fresh air, after washing their faces with water, and their fauces with roses.

On the Diseases of Braisiers.

Persons of this profession inform me that these noxious exhalations produce no disorders of the eyes, which is agreeable to the assertion of Macrobius, who tells us: Lippitudes and inflammations of the eyes are cured by working in Brass Mines; for which reason 'tis customary with some persons to prepare collyriums with brass.

Of the Diseases of Carpenters, Joiners and others.

They must also have their eyes constantly and attentively fix'd on their work, by which means they are considerably injured, since by the circumgyration of the wood, their spirits and humours contract a kind of vertiginous motion.

The best advice I can give to tradesmen of this kind, in order to prevent diseases, is, not to overwork themselves, and by that means bring on disorders which may for a long time incapacitate them for their business.

They are also to preserve and defend their sight, by frequent intermissions from labour; and if their eyes should be seized with a pain or redness, they are to be washed with temporate substances, such as barley water, water of violets, and women's milk.

Of the Diseases of Cutlers and Razor Makers.

By continually and attentively fixing their eyes upon the grindstone which is turned round with excessive velocity (these workers) have the tone of their eyes impaired, and in process of time their sight render'd dull. Some of them also, especially those who have weak heads, are, after working a whole day, not only subject to vertiginous disorders, but also imagine that they see the stone turning before their eyes. 'Tis probable, that by this external and occasional cause the humours of the eye, especially the aqueous, which is naturally moveable, and the animal spirits are put into a gyratory motion, by which means the natural osconomy of the eye is perverted. I knew a skilful razor maker, who, after working for a whole day, was generally afflicted with violent inflammations and redness of the eyes, nor could he charge his misfortune upon any other cause or circumstance than his business.

EYE AFFECTIONS FOLLOWING EXPERIMENTAL THYROIDECTOMY.

BY

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IN the discussion following the reading of an account of an experiment by myself, in which excision of the thyroid and parathyroids from a dog was followed by, and had probably caused, double cataract[1], the question of other ocular affections caused in the same way was incidentally raised.

I have since looked up my notes, and find sixteen experiments in which eye affections occurred after and were probably caused by the thyroid operation. The eye affection generally followed a complete excision of the thyroid and parathyroids, but to this, as we shall see, there was an important exception.

In several cases a ground-glass appearance of the corneæ, resembling syphilitic keratitis, was noted, and often this condition passed on to ulceration of the cornea, with more or less collapse of the eyeball. These affections occurred at a time when the animal was very ill from other symptoms produced by the operation, tremors, spastic paralysis, and convulsions, soon to be followed by death; so that even in those cases in which one eye was unaffected, or the cornea was not ulcerated, either condition might have arisen later had it not been for the death of the animal.

As stated, the eye affection generally followed a complete excision of both thyroid and parathyroid glands, but to this there was an exception.

Certain of the experiments, but quite a small proportion of the whole, consisted in excising on one side only the thyroid lobe with its parathyroids; on the other side, the thyroid lobe and its parathyroids were left intact, but a considerable length of the nerves supplying them was excised; the animal thus being left with only one thyroid lobe and its parathyroids, and these deprived of their cerebro-spinal nerve supply. The result of this operation was that out of 19 experiments, 3 had such severe athyroidic symptoms that they died, 2 had symptoms from which they recovered, and the remaining 14 had no symptoms. Those, however, of the 14 which were submitted to a further operation completing the excision, died, as was to be expected, in a few days. Now, in no less than 5 of these 19 experiments, eye affections occurred, twice in dogs which died of the results of the first operation, twice in dogs which had symptoms after the first operation and recovered from them, and once in a dog which had no symptoms from the first operation but died after the second or completing operation.

This is a greatly higher proportion of eye complications than occurred with the simple total excision operations, and therefore it must be inferred that the altered secretion of the thyroid and parathyroids produced by interference with their nerve supply is more inimical to the nutriment of the cornea than the toxins produced by complete excision of the glands[2]. It will be remembered that the excision of one lobe only of the thyroid together with its parathyroids, leaving the opposite lobe and its parathyroids and also their nerve supply intact, is not in a dog productive of any symptoms; also that the division of the nerve supply to the parotid gland alters the character of its secretion.

Similar eye changes have been observed by others. In order the better to study them, Gley sought the assistance of an ophthalmic colleague, A. Rochon-Duvigneaud. They say that nearly all observers who have made these experiments have noticed a certain number of cases in which there has been conjunctivitis, very often intense. They themselves describe also opacity of the cornea, the cornea becoming opalescent, like white china. In two cases, the cornea softened, became conical, and the apex of the cone ulcerated. Microscopic examination showed the lesion to be an interstitial keratitis. The conical cornea resembled that which occurs in man secondarily to interstitial keratitis, and is quite distinct from the conical cornea in which the cornea remains transparent. They also observed in one or two cases an acute blepharitis, with abundant products of secretion, and also add that this lacrymal secretion in thyroidal experiments is no doubt similar to the abundant salivary secretion seen in thyroidectomized dogs and rabbits during convulsive attacks[3].

Halsted, in his experiments[4], found two cases with conjunctivitis and one case in which the dog became partially blind, and in whose eyes nothing abnormal could be seen with the ophthalmoscope.

Turning to disease in man, the parathyroids are probably unaffected both in myxœdema and in Graves's disease; in the latter the excessive secretion of the thyroid plays an important part, as shown, for instance, by the great and immediate improvement caused by partial excision of the gland in the disease. It seems, however, that the nervous system also plays a part, for emotion can act as an exciting cause: one of the cases described in Parry's classical paper[5] is that of a girl who was run away with by a bath chair down a hill.

The thyroid secretion in excess is a poison, and thus there is, as Professor Sattler insists, a toxin circulating in the blood. He, an ophthalmic surgeon, is of opinion that all the cases of ulceration of the cornea in Graves's disease cannot be accounted for by mechanical causes[6]. Also in the article on Graves's disease in the "American Encyclopædia of Ophthalmology," it is stated that very rarely optic neuritis and optic nerve atrophy are found.[7] Recently, James Taylor has recorded a case of optic atrophy occurring in, or with, this disease.[8]

With respect to treatment, that of myxœdema is by administration of thyroid; that of Graves's disease, if not too mild or too severe, should, I hold, be by partial excision of the goitre. The symptoms of Graves's disease resemble somewhat those produced by experimental excision of the thyroid and parathyroids: the treatment of the latter is by the administration of calcium or of parathyroid, the former, in my experience, being better; but the calcium should be administered in large quantities, best by giving a diet consisting solely, or nearly so, of milk. Five grains of lactate of calcium three times a day would correspond only to two and a half ounces of milk once a day.

REFERENCES.

1. **Edmunds, Walter.**—Ophthalmological Section, Royal Society of Medicine, February 2nd, 1916. THE OPHTHALMOSCOPE, March, 1916.
2. *Journal of Pathology and Bacteriology*, Vol. XII, p. 101, 1907.
3. *Archives de Physiologie*, Series 5, Vol. VI, p. 101, 1894.
4. **Halsted.**—*Johns Hopkins Hospital Reports*, Vol. I, 1896.
5. **Parry's** Medical Writings, Vol. II, 1825.
6. **Sattler.**—*Lancet*, Vol II, 1910, and Vol. II, 1911.
7. "American Encyclopædia of Ophthalmology," Vol. VI, p. 4805.
8. **Taylor, James.**—*Lancet*, March 25th, 1916.

A SUGGESTION AS TO THE CAUSE OF MYOPIA.

BY

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FOR the last few years ophthalmologists have been writing with greater and greater frequency pointing out that myopia is hereditary. There have been many theories as to the cause, but, as far as I am aware, von Ammon is the only one who has suggested a congenital defect, and he does not in any way suggest that it is transmitted from one generation to another.

For years it has been passed on from one text-book to another (and accepted as a fact) that there is a marked difference between the ciliary muscles of the myope and hypermetrope.

I would put forward the suggestion that it is this difference in the ciliary muscle which is the cause of myopia, and that this difference is transmitted as an hereditary defect.

The pectinate ligament is composed of trabeculæ which show a distinctly fibrillar structure, enclosing alveoli, "the larger of which are elliptical, and so directed that their long axes are parallel to the margin of the cornea" (Fuchs). The inner surface of the ligament is covered with endothelium, which is continuous with that forming the lining membrane of the anterior chamber: this endothelium dips down between the trabeculæ of the pectinate ligament, and in this way a series of lymph spaces is formed between the anterior chamber and Schlemm's canal. This arrangement whereby the sinuses have their long axes parallel to the corneal margin, is very striking, for one would have expected that in a tissue composed of fibres running at right angles to the margin of the cornea, the sinuses would have had their axes in the same direction. Since these fibres are embryologically derived from Descemet's membrane, they contain elastic fibres: from this it follows that when there is no tension at right angles to the axes of the alveoli, the elastic fibres will act, and thus narrow the alveolar spaces. I take it for granted that by this time (despite all the controversy on the subject) it is recognised that fluid does pass through the pectinate ligament into Schlemm's canal and the supra-choroidal spaces.

Iwanoff pointed out that in the emmetropic eye Müller's muscle constitutes about one-tenth of the ciliary muscle; in the hypermetropic eye about one-third; whilst in the myopic eye it is deficient or entirely absent. That this difference in the size of the muscles is not due either to disuse or the reverse, is shown by the following quotation from J. H. Parson's "Pathology of the Eye," page 334: "The ciliary muscle consists of two parts, the outer meridional, Brücke's muscle, and the inner circular, Müller's muscle. Both are made up of unstriped fibres and are variously developed in different eyes ; the former most in myopic eyes, the latter in hypermetropic eyes. The difference in development is present in the new born (Lange)." Again, on page 913 : "It is noteworthy that Merkel and Kallius, E. Fick, and Lange observed marked individual variations in the size and arrangement of the ciliary muscle in new-born children." Fuchs writes : "This muscle has a smaller transverse diameter than in the emmetropic eye, since the circular fibres are less developed, and are sometimes, indeed, almost wanting. These circular fibres, in fact, are mainly the ones whose function is to provide for accommodation, and as accommodation is but little employed in a myopic eye, they are not properly developed there." In this passage he has pointed out the fact which is so frequently lost sight of by writers on this subject, namely, that myopes use their accommodation very little ; but I think that he is wrong in attributing the improper development of the muscle to lack of use, for according to the various observers quoted above, the condition of Müller's muscle in myopia is present at birth.

When the longtitudinal fibres of the ciliary muscle contract, they pull the choroid forward, owing to their attachment to the lamina fusca, and in this way the supra-choroidal spaces, from being narrow, will tend to assume a more spherical form, in which shape they will contain more fluid. This will exert a suctional force upon the fluid in the spaces of Fontana. Thus there will be a stream flowing from the anterior chamber into the supra-choroidal spaces whenever the longitudinal fibres contract and relax during accommodation : when the myope ceases to use his accommodation as frequently as he did owing to his far point having approached nearer to his face, then the pumping action will *pari passu* become less and less. In those eyes possessing the circular bundle, its action during accommodation is to drag the ciliary body inwards, thus widening the angle of the anterior chamber, and at the same time it will cause the alveoli in the pectinate ligament to become more spherical, thereby allowing more fluid to flow through. In the myope, where this bundle is deficient, this action is correspondingly less and less until it is *nil* in the case of those eyes where it is entirely absent. Not only is there absence of these functions, but there is no counteraction of the effect produced by the radial and longitudinal fibres when they pull the ciliary body forward and outward, thus lessening the angle of the anterior chamber. I would also suggest that the action of the circular fibres, like that of the longitudinal, is that of a pump during the contraction and relaxation necessitated by the act of accommodation. Just as in the case of the elastic fibres of the choroid, so those elastic fibres in the pectinate ligament will cause the alveoli therein to narrow after the action of the muscular contraction has passed off. Thus, in the normal eye, accommodation not only results in clearer vision, but also aids in the exit of the fluid from the anterior chamber. It is natural that this use of the ciliary muscle should have been overlooked in the past, owing to the early discovery of its function in accommodation—here was the use of the muscle and therefore no need to look for any further function. Since there seems to be a general agreement amongst observers that the difference in structure is present at birth, we may take it that the difference is certainly not the result of disease, of mechanical pressure, or of disuse. Surely, the cause is due to the hereditary transmission of the defect from parent to child. This was long ago suggested by Donders in the following passage : "I have never seen an hypermetropically constructed eye become near-sighted. Even in many emmetropic eyes simple tension of accommodation for near objects has but little effect. In fact, the predisposition is almost invariably congenital, and in that case it is moreover always hereditary."

If the condition is present at birth, what will be the effect on an eye which is deficient in Müller's bundle? There may or may not be a visible change in other parts, according as the defect is great or small. Critics will at once say that the effect will be buphthalmos. In this disease, I take it that the cause is an anatomical defect in the angle of the anterior chamber, preventing the passage of fluid. In this disease the opposition to the exit of fluid is of a continuous nature, whilst that which I am endeavouring to show in myopia will not be continuous, since there will always be more or less of a pumping action going on from the contraction of the longitudinal fibres and the pupil, and, moreover, whereas in the former it is a case of obstruction rather than a lack of force behind. The same arguments will apply to glaucoma, although in the chronic forms, where Motais says that myopia is more frequently found than hypermetropia, it would seem as if the lack of a *vis a tergo* had something to do with it. It has been pointed out that in chronic glaucoma Müller's muscle is very frequently found to be absent or very much atrophied (this has always been called an atrophy, although no observations have been made as to why the circular fibres only are atrophic). It apparently did not seem strange that only one part of the muscle should be attacked. I would suggest that in these cases the absence of Müller's muscle is due to the same cause as that which is operative in myopia.

On the subject of increased tension I do not wish to dilate, as I believe that it is impossible to prove it in myopic eyes. What may be increased tension in an eye the walls of which have already reached their adult consistency, and that which may for a young growing eye be an increased tension, are so utterly incomparable that it is waste of time to try and work out any analogy between them. Nevertheless, there seems to be a consensus of opinion that there is some increase of tension in the myopic eye, although nearly every writer seems to be chary of expressing himself definitely. J. H. Parsons, in his "Pathology of the Eye," p. 924, writes: "There is no doubt that the action of the extrinsic muscles causes increased intra-ocular tension, a fact which is readily proved experimentally, and makes the use of curare imperative in manometric observations upon the tension. Even if the tension is normally greater in myopic eyes (Arlt, Mackenzie, Donders, Hasner, Junge), which is certainly not proved, the effects of increased tension on young eyes is certainly quite different from the condition found in myopia. Arlt and Stilling consider this to be due to the increase not being continuous, and to its low degree." Nevertheless, myopia, indistinguishable from the ordinary kind, does occur as the result of increased tension, as may be seen in those not infrequent cases of chronic glaucoma, where a myopia commences in the middle of the disease and stays the progress of the contraction of the field.

If now, as I suggest, it is the pumping action of the ciliary muscle which is at fault, what are the conditions in the myopic eye which favour the increase of tension?

In the first place, I think that the large pupil of the myope has an unfavourable influence in an eye the ciliary muscle of which is already weak. Further, after the eye has reached a myopia of three dioptres, the accommodation is no longer called into play; in this way the ciliary muscle no longer, by its alternate contraction and relaxation, pumps out the aqueous. Another factor is, that when the myope no longer has to accommodate, the miosis which accompanies it no longer takes place. In support of this I may be allowed to quote an experiment of Pagenstecher, in which he injected Berlin blue into the human eye, in two cases, shortly before death; one eye had atropine instilled, and the other eserine. In the former, no injection of the circumcorneal vessels occurred, whereas it did in the latter, so that the constriction of the pupil has a marked effect in improving the conditions of filtration. I consider that this contraction of the pupil exerts an effect upon the flow of the aqueous through the angle; and the more often this contraction and relaxation takes place, the more regular the flow. When the myopia has become stationary through the wearing of proper glasses, in those cases where the circular fibres of Müller are not wanting entirely, this is due, in my opinion, to the fact that the ciliary muscle is now obliged to take up the neglected function of accommodation. The eye is not always focused for infinity, but is compelled to focus near objects in the way originally intended by Nature. The correction of the myopia necessitates the use of accommodation for near objects, and in so doing, it makes the pupil contract in the manner usual to the emmetrope. I have observed cases where the pupil of the myope has resumed its normal size on the wearing of proper glasses.

Here I would like to call attention for a moment to those cases of monocular myopia which so obviously squint outwards, although I wish to return to them later from another point of view. In these cases, although the myopia increases, there can be no question of the increase being due to the action of the extrinsic muscles which are used in convergence, since the eye has ceased to converge. The same arguments apply as regards the production of myopia by stooping. "What is sauce for the goose is sauce for the gander," and if we use the argument for the myopic eye, we must show cause why the non-myopic eye has not been affected similarly.

How far the strain of convergence is a factor may be judged by considering the hypermetrope who squints inwards.

If the convergence due to close reading is the cause of myopia, then every eye with internal strabismus should be myopic, whereas it is practically always the more hypermetropic of the two.

For those who believe that convergence produces an increased tension sufficient to have an effect on the structure of the eye, I would suggest that the increased pressure in convergence is counterbalanced by the extra action of the largely developed circular bundle in promoting the flow of the aqueous.

Again, spasm of accommodation has been cited as a cause. The young hypermetrope of three dioptres has his ciliary muscle in a chronic state of contraction amounting to three dioptres, and yet he passes through life without becoming myopic. Here his ciliary muscle still continues its pumping action, for in order to see at his near point he must use more accommodation, so that he also alternately contracts and relaxes his muscle, although he never relaxes completely.

In support of my suggestion, I would quote the following: Domec, in *La Clinique Ophtalmologique*, Vol. IV, p. 474, believes that pressure massage used in combination with miotics, and the wearing of fully correcting glasses, is a means capable of arresting the development of myopia. The explanation of its effect which he gives is that the aqueous, driven into the sinus by the slow pressure, dilates the natural passages, so that a larger quantity of intra-ocular fluid is excreted each time than usual. During this treatment, which is kept up for a long time, the zonule becomes more elastic and the ciliary muscle stronger. I consider that in these last few words of Domec lies the key to the question as to how myopia becomes stationary.

If in the myope the ciliary muscle is slightly developed, then it may have just sufficient strength to do its work, when after the stretching of the eye to a slight extent, the channels of escape of the aqueous have become sufficiently enlarged to compensate for the feeble driving power which the ciliary muscle exerts on the aqueous. Hearts, although damaged by disease, frequently maintain the circulation sufficiently to prevent the patient becoming waterlogged, and I would suggest that the filtration apparatus of the eye becomes compensated in some such way as Domec has suggested, although more often by natural means than by those suggested by Domec.

The theory that myopia is due to close work, aggravated by town life and badly lighted rooms, is gradually giving ground before statistics; for which I would refer to the figures given by Arnold Lawson for the Aldenham and St. Jude's schools—where the percentage of myopia was actually 5 per cent. more in the better lighted and ventilated school. I am certain that in the part of this country in which I live the myopia is quite as frequent in the rural districts as in the town, and that there is a greater frequency of high myopia in quite young children than in other portions of the country in which I have worked. Yet this is a purely agricultural county. The reason, I think, is that there has been such a great deal of inter-breeding of families. Many statements have been made regarding fine work at certain occupations as a cause, but during the last few years I have seen no figures brought forward to show this. Nevertheless, I would not like it to be thought that I think fine work has no influence upon a myopia already established. Such an admission does not prejudice my views as to the actual cause of the disease.

In regard to heredity, myopia attacks boys and girls with about equal frequency. For this I would refer to the figures of Lawson, *British Medical Journal*, 1898, p. 1614, and Motais and the Eugenics' "Laboratory Memoirs," Vol. V.

In the case of monocular myopia, the sound eye has a ciliary muscle with Müller's bundle properly developed, the myopic eye is deficient in Müller's bundle, and as a consequence there is not the same machinery for promoting the normal flow of aqueous. Here there is no need to invoke causes which must act equally on both eyes to explain the disease being present in one eye only. Moreover, as I said before, these monocular cases should dispose of the extrinsic muscle theory, as the myopic eye almost invariably diverges. I own that my case would be greatly strengthened if I could obtain a family tree in which the myopia was confined to one eye on the same side; and what would be more interesting still, would be sections from the eyes of a patient with monocular myopia showing the difference in the ciliary muscle on each side. Perhaps, if this theory finds credence, someone may find such a case capable of being studied pathologically. I would like to mention a case of twins which I have seen. They were of the same sex, and almost of similar appearance, and are evidently the product of one ovum. They have nearly the same amount of myopia, and the grounds of the fundus are exactly alike. This is easily explicable by the theory that each muscle was alike, and that in them the circular fibres were of the same volume.

Racial myopia has long been a subject of discussion, especially from the point of occupation; but I would suggest that it has far more significance when approached from the hereditary side, and is more satisfactorily explained by a congenital defect transmitted from parent to child.

A CLINICAL STUDY OF FIFTY-FIVE CASES OF INTRA-OCULAR RETENTION OF FOREIGN BODIES, WITH RESULTS TWO YEARS AFTERWARDS.

(Continued.)

BY

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I. Number of case	22.
II. Eye affected	Left.
III. Position and character of the wound	Small oblique ciliary wound (3 mm.) at nasal side.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Prolapse of iris.
V. Visual acuity of injured and uninjured eye	Left: $\frac{6}{12}$. Right: $\frac{6}{12}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Negative.
VIII. Position of foreign body ...	Iris.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Spicule of metal (1 mm. long) extracted from prolapsed iris. Prolapse replaced.
X. Results two years afterwards	Left: $\frac{6}{12}$. Right: $\frac{6}{12}$. Saved.

I. Number of case	23.
II. Eye affected	Left.
III. Position and character of the wound	No visible wound.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	History of having been struck in the eye with a bit of metal. Signs of acute iridocyclitis present, with exudate in pupillary area.
V. Visual acuity of injured and uninjured eye	Left: perception of light. Right: $\frac{5}{5}$.
VI. Time intervening between date of injury and patient first presenting himself	Four days.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Localized in sclera at outer part of eyeball.
IX. Magnet and other operations, and subsequent complications	When patient was admitted (in my absence on vacation), the electro-magnet was applied and was negative at all points. No plate was taken, and a diagnosis of gonorrhœal iritis was made. After some improvement with local treatment and anti-gonococcic serum, patient was dismissed, after being four weeks in hospital. Owing to recurrent pain and attacks of iridocyclitis, and the eye having practically no vision in it, while patient was attending out-patient department, enucleation was advised. He was re-admitted 2½ months after the date of injury for that purpose.

	Before enucleation. I took an X-ray plate, which was positive. During the enucleation, on hooking up the external rectus before dividing it a piece of metal (3 mm. by 2 mm.) was found embedded in the sclera. It had probably travelled in an oblique direction from within outwards.
X. Results two years afterwards	Visual acuity. Right [illegible] Lost.

I. Number of case	24.
II. Eye affected	Right. Penetrating (5 mm.) scleral wound. Nasal side.
III. Position and character of the wound	Abrasion right side of nose. Penetrating puncture wound of inner end of upper lid in front of scleral wound.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Tension minus. Ophthalmoscopic examination showed numerous blood clots in vitreous and apparently a large piece of metal. Vitreous track leading from wound to what appears to be the metal.
V. Visual acuity of injured and uninjured eye	Right [illegible]. Left [illegible].
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Anterior part of vitreous.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Considerable difficulty in extraction of metal. On first attempt to draw into anterior chamber, iris bulged on nasal side and corneal section and iridectomy done, but metal would not come forward. Next, on attempting to draw through original wound, the scale engaged "broadside on," and probe had to be passed alongside the magnet point to point, the edge of the scale forward, when extraction was easy. Large scale (7 mm. by 5 mm.). Scleral wound covered by conjunctiva. Two days later, signs of commencing panophthalmitis. Pus in lips of wound and in anterior chamber. Enucleated. Socket douched with sublimate (1 in 2000).
X. Results two years afterwards	Visual acuity. Left $\frac{6}{6}$. No complaint. Lost.

I. Number of case	25.
II. Eye affected	Left.
III. Position and character of the wound	A 6 mm. corneo-scleral wound, at seven o'clock on limbus
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	[illegible] Irregular pupil Iris engaged in wound "Hole" in iris behind wound.
V. Visual acuity of injured and uninjured eye	Left: hand movements. Right: $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	[illegible]
VIII. Position of foreign body ...	[illegible]
IX. Magnet and other operations and subsequent complications	[illegible] [illegible] [illegible] through corneal part of wound [illegible]
X. [illegible]	[illegible]

I. Number of case	26.
II. Eye affected	Left.
III. Position and character of the wound	Scleral wound (5 mm.) nasal side.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Escape of vitreous. Tension minus.
V. Visual acuity of injured and uninjured eye	Left [illegible]. Right : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day,
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Attempt to draw into anterior chamber not successful. Easily extracted through original wound. Chunk, 4 mm. × 3 mm. × 2 mm. Conjunctiva sutured over wound. Enucleated 4 days later. Plastic iridocyclitis.
X. Results two years afterwards	Right : $\frac{6}{6}$. No complaint. Lost.

I. Number of case	27.
II. Eye affected	Right.
III. Position and character of the wound	Scleral (7 mm.) down and in near limbus.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Hyphæma. Tension minus. Large escape of vitreous. Prolapse of choroid and retina, Disorganised eyeball.
V. Visual acuity of injured and uninjured eye	Right : Shadows. Left . $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	Vitreous—anterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Anterior chamber route not successful. Extraction of large chunk through original wound (5 mm. × 5 mm. × 3 mm.). Enucleation two days later. Disorganised eyeball.
X. Results two years afterward	Left : $\frac{6}{6}$. No complaint. Lost.

I. Number of case	28.
II. Eye affected	Right.
III. Position and character of the wound	Cystoid scar (3 mm.) in sclera at nasal side of limbus.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	History of having been struck by chip of metal 10 days ago. Right pupil smaller than left, but reacts well to light and dilates equally and well with homatropine. No iritis. Ophthalmoscopic examination shows glistening substance in anterior part of vitreous at nasal side.
V. Visual acuity of injured and uninjured eye	Right : $\frac{6}{12}$. Left $\frac{6}{12}$.

VI. Time intervening between date of injury and patient first presenting himself	10 days.
VII. X-ray plate	Positive (?)
VIII. Position of foreign body ...	Anterior part of vitreous originally, then ciliary region after first magnet operation.
IX. Magnet and other operations, and subsequent complications	Electro-magnet applied externally on admission. Sharp pain but metal refused to come forward into anterior chamber, evidently becoming fixed in the ciliary region. Corneal section with point of magnet in anterior chamber. No result. Then another plate taken—still positive—but shows foreign body further forward—in ciliary region. Second trial by electro-magnet. Corneal section. No result. Anterior chamber allowed to re-form. Third trial by electro-magnet and corneal section (4 days after after admission) and iridectomy above; extracted scale $1\frac{1}{2}$ mm. × $1\frac{1}{2}$ mm. (with difficulty.
X. Results two years afterwards	Visual acuity. Right: $\frac{6}{24}$. Visual acuity. Left [illegible] No complaint. Saved.

I. Number of case	29.
II. Eye affected	Right.
III. Position and character of the wound	Small angular corneal wound at nasal side in horizontal meridian.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Iris engaged in wound. "Hole" in iris behind wound. Lens cataractous.
V Visual acuity of injured and uninjured eye ...	Right: counts fingers. Left: $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Foreign body drawn into anterior chamber and extracted through original wound, slightly enlarged. Small chunk (5 mm. × 3 mm. × 2 mm.). Enucleated 8 days after Iridocyclitis.
X. Results two years after-[illegible]	[illegible] Lost.

I. Number of case	30.
II. Eye affected	Right.
III. Position and character of the wound .	Small penetrating corneal wound to nasal side. Linear streak of Descemet's membrane.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Localized cataract. "Hole" in iris behind wound.
V. Visual acuity of injured and uninjured eye	Right: [illegible] [illegible]
VI Time intervening between date of injury and patient first presenting himself	Same day
VII. X-ray plate	[illegible]
VIII Position of foreign body ...	[illegible]

IX. Magnet and other operations, and subsequent complications	Electro-magnet. Foreign body drawn into anterior chamber and extracted through original corneal wound. Small scale (1½ mm. × 1½ mm.). Iris, engaged in wound, was snipped.
X. Results two years afterwards	Right: $\frac{2}{60}$. (Cataract appears localized and has not progressed) Left [illegible] Saved.

I. Number of case	31.
II. Eye affected	Right.
III. Position and character of the wound	Small penetrating corneal wound—upper and outer quadrant. White streak of Descemet's membrane.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	"Hole' ' in iris behind wound. Right pupil contracted. Lens cataractous.
V. Visual acuity of injured and uninjured eye	Right: [illegible] Left [illegible]
VI. Time intervening between date of injury and patient first presenting himself	Same dav.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Foreign body drawn into anterior chamber Corneal section and extraction of small chunk (3 mm. × 2 mm. × 1 mm.). Prolapsed iris excised 10 days later, lens matter drawn oft.
X. Results two years afterwards	Right: $\frac{4}{60}$c. + lenses. Corneal nebula. Left: $\frac{6}{6}$. No complaint. Saved.

I. Number of case	32.
II. Eye affected	Right.
III Position and character of the wound	Healed wound of sclera (5 mm.) down and out. Healed punctured wound of lower eyelid in front of wound.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Vitreous hazy. Vitreous track from site of scleral wound backwards and inwards.
V. Visual acuity of injured and uninjured eye	Right: $\frac{6}{18}$. Left: $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	9 days.
VII. X-ray plate...	Positive,
VIII. Position of foreign body ...	Vitreous—posterior part,
IX. Magnet and other operations, and subsequent complications	Owing to iridocyclitis present, the metal was removed through the old scar, which was re-opened for the purpose. No loss of vitreous. Since dismissal, when the eye looked well and the vision was 6/36, patient has had recurrent attacks of iridocyclitis and the retina has become detached at the site of the wound. Owing to these attacks of pain, aud the eye being practically blind, enucleation was performed six months after the injury.
X. Results two years afterwards	Left: $\frac{6}{6}$. Quiet. Lost.

I.	Number of case	33.
II.	Eye affected	Right.
III.	Position and character of the wound	Scleral (6 mm.) nasal side of limbus.
IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Iris engaged in wound.
V.	Visual acuity of injured and uninjured eye	Right: counts fingers. Left [illegible].
VI.	Time intervening between date of injury and patient first presenting himself	Same day.
VII.	X-ray plate	Positive.
VIII.	Position of foreign body ...	Behind eyeball.
IX.	Magnet and other operations, and subsequent complications	Electro-magnet on admission caused dragging pain. No result even when point was inserted deep into wound. Eye remained fairly quiet for a few days, then had severe attacks of iridocyclitis. Enucleation advised, but no consent until a month after admission, when eye was excised. Patient complained a month after enucleation of pain in left eye. Visual acuity left: $\frac{6}{18}$. No iridocyclitis, except a few spots of k.p., but marked optic neuritis. Swelling of disc, 3 D. Positive blood count (large hyaline cells 21·2 per cent.). Spindle-shaped enlargement of blind spot. Under local treatment, and large doses of salicylates, gradually improved and was eventually dismissed. Visual acuity left: $\frac{6}{6}$ and reads J. 1.
X.	Results two years afterwards	Visual acuity. Left: $\frac{6}{6}$. No complaint. Ophthalmoscope shows faint pigment change at macula. Lost, *plus* sympathetic ophthalmitis.

I.	Number of case	34.
II.	Eye affected	Left.
III.	Position and character of the wound	Small oblique penetrating corneal wound (8 mm.) on temporal side.
IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Hole in iris at outer part. Media clear.
V.	Visual acuity of injured and uninjured eye	Left [illegible] Right: $\frac{6}{6}$.
VI.	Time intervening between date of injury and patient first presenting himself	Same day.
VII.	X-ray plate	Positive
VIII.	Position of foreign body ...	Ciliary region at temporal side.
IX.	Magnet and other operations, and subsequent complications	Electro-magnet. Foreign body drawn into anterior chamber, [illegible] could not be extracted by original wound route. Limbal section, and extraction of small chunk (2 mm. × [illegible]).
X.	Results two years afterwards	[illegible] [illegible] Saved

(To be concluded.)

TWO CASES OF PARALYSIS OF THE SYMPATHETIC ASSOCIATED WITH CERVICAL RIB.*

BY

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LONDON, ENGLAND.

Cases.

(1) J. B., female, aged 9 years. Seen first at the Central London Ophthalmic Hospital, May 11th, 1915.

It has been noticed for some time that the right pupil has been much smaller than the left, and that there is also a droop of the right eyelid. The symptoms were attributed to her being knocked down by a motor bus four years ago, but this has not been definitely established.

The right pupil is smaller than the left and does not dilate on shading or to cocaine. There is ptosis and apparently some diminution of sweating on the right side. There is also enophthalmos. On examination of the right side of the neck, there is an osseous swelling above the first rib, which, on being examined by X-rays, is shown to be a cervical rib, which passes downwards towards the first rib and is probably attached to it. There are no other paralyses, such as are frequently associated with cervical rib.

(2) S. C., female, aged 46 years. Came to Bolingbroke Hospital for refraction. Patient noticed the left pupil was smaller and the lid has drooped since she was about 12 or 13 years of age.

Left pupil smaller than the right and does not dilate on shading or to cocaine. There is slight ptosis and diminution of sweating on the right side. There is also enophthalmos. On examination of the left side of the neck, there is a large osseous swelling above the first rib, which, with the X-rays, is shown to be a cervical rib. This is present also on the right side, but is not nearly so large. On the left side it is seen passing downwards towards the first rib, to which it is probably attached. There seem to be no other paralyses such as are usually associated with the condition of cervical rib. Right and left vision 6/6 and J. 1.

Remarks.

Considerable interest has been shown at various times in cervical rib and lesions associated therewith. In practically all the cases lesions of the cervical sympathetic have not been noted, although various paralyses of the arm and hand have been recorded. These later signs were absent in the two cases described above and a lesion only of the sympathetic found.

CLINICAL AND PHYSIOLOGICAL MEMORANDA.

HYPERMETROPIA: SOME EXTREME CASES.

BY

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I HAVE had under my observation for several years a family of five children, three of whom have hypermetropia in extreme degrees, and I think the cases merit recording.

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*Cases shown at the Ophthalmological Society of the United Kingdom, May 5th, 1916.

Cases.

1. Lizzie S., aged eight years, has V., R.E.=6/36; L.E.=6/36 and retinoscopy under atropine gave $\overset{+17}{\boldsymbol{+}}\,+19$ $\overset{+19}{\boldsymbol{+}}\,+20$. She had prescribed for constant use glasses +14+16 D., and with these she got 6/18 and J.4.

2. Thomas S., aged seven years, has V., R.E.=6/36, and L.E.=6/36 and retinoscopy under atropine gave $\overset{+12}{\boldsymbol{+}}\,+13$ $\overset{+15}{\boldsymbol{+}}\,+15$. He had prescribed for constant use glasses +10+12 D., and with these he got 6/12 and J.1.

3. Rachel S., aged five years, retinoscopy under atropine gave $\overset{+13}{\boldsymbol{+}}\,+14$ $\overset{+16}{\boldsymbol{+}}\,+16$. She had glasses +8 +9 D. prescribed for constant use

Remarks.

I had no reason to think the lenses were absent in these cases. I examined the two younger children and both parents, and found that their refraction was normal.

There is no history of defective vision in the family, as far as can be ascertained.

These cases are, in my experience, rare, although higher degrees of hypermetropia have been recorded.

Here briefly are the facts of another family:

1. R. D., aged fourteen years, retinoscopy = $\overset{+12}{\boldsymbol{+}}\,+13$ $\overset{+11}{\boldsymbol{+}}\,+13$.

2. J. D., aged twelve years, retinoscopy = $\overset{+8}{\boldsymbol{+}}\,+9$ $\overset{+9}{\boldsymbol{+}}\,+10$

The parents in this family also have normal refraction.

In neither of these families are the parents related. They are slightly undersized, but otherwise they seem ordinary people. The cases are congenital, and are probably hereditary. I have notes of other cases of hypermetropia, but not quite so extreme as the above, where one of the parents is also similarly affected.

High degrees of myopia are found where the transmitting parent is normal and also where the transmitting parent presents only slight degrees of myopia, say 0·5 D.

Hypermetropia crops up in myopic families, *i.e.*, families in which both parents are myopic and where all the offspring are myopic, but the one exhibiting the other extreme.

The ametropia found in children frequently corresponds in kind and degree with that present in the parent.

These inequalities might be better understood if we had some knowledge of the details of the pedigrees for several generations.

The parental and ancestral contributions may tend to a racial average, to opposite extremes, or to the same extreme. The last variety, even if unexpressed in the parents, would explain the occurrence of these cases of high hypermetropia.

(From the Institute of Physiology, University College, London.)

BINOCULAR VISION.*

BY

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LONDON, ENGLAND.

THE perception of binocular relief and solidity is not dependent upon the combination of images falling upon disparate points of the two retinas, although when images do fall upon adjacent disparate points, they are combined with an alteration in their projection in space. If two photographs taken from the same negative be placed one on either side of the stereoscope, a striking appearance of relief is obtained, although the photographs are not stereoscopic photographs and no double images are formed. When these are carefully compared with the same view taken with stereoscopic photographs combined in the usual way, in most cases the perspective is better with the stereoscopic photographs, but in some cases it is difficult to detect any difference. If an ordinary stereoscopic photograph of a scene be placed in the stereoscope and viewed in the ordinary way, the usual striking appearance of relief is obtained. If now whilst the eyes are still looking at the photograph, a sheet of white cardboard be dropped over one of the photographs, so as to entirely occlude this photograph and only present a white surface to one eye, a striking appearance of relief remains. This fact may be emphasized even more by altering the experiment in the following way.—If the cardboard be placed so that only half of one photograph be occluded, a careful comparison can be made between the upper and the lower halves of the combined visual field. It will be noticed that when there is one picture in the stereoscope and a white blank on the other side, the appearance of solidity is greatly diminished when the eye receiving the impression of the white surface is closed.

We can also obtain pictures in strong relief by combining two halves of a stereoscopic photograph—that is to say, half of the photograph which is usually presented to the right eye is shown on the right side and half of the left is shown on the left side. This may be done by placing a sheet of white paper of appropriate size in the centre of the field of vision ; in this way there is no common object in the field of vision and yet the stereoscopic photographs combine into an object in strong relief. It will be noticed that the appearance of relief is in some cases even more marked in this way than with ordinary stereoscopic photographs.

It would appear that in ordinary binocular vision the right eye dominates for the right side and the left eye for the left of the combined field unless the position of two points in space be noted, when one eye, usually the right, dominates. The mind projects outwards the appearance of a solid object which would give rise to the images falling upon the retinas. This also applies to those cases in which images falling upon disparate points are combined, as, for instance, when the images of two daggers are combined in

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the stereoscope and appear as a dagger standing straight out from the table; the images in the stereoscope are similar to those thrown on the two retinas by a dagger standing straight out from the table. When the mind is not able to project the image of an object in space which would produce the two images, double images or binocular struggle or rivalry take place. Binocular struggle is absent when the half photographs are combined in the above way.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—HYDATID CYSTS OF THE ORBIT.

Cirincione, Speciale. Some points in the diagnosis of hydatid cysts of the orbit. (Considerazioni diagnostiche sulle cisti da echinococeo dell'orbita.) *La Clinica Oculistica*, Dicembre, 1915.

Cirincione, of Rome, publishes two observations of this rare condition, and shows how the modern methods of investigation have made the diagnosis more certain.

To-day, he says, diagnosis rests on four points:—

1. *Exophthalmos.*—This has no pathognomonic importance, but in cases of the present kind is always outwards and usually downwards rather than upwards. It is, moreover, associated with early loss of mobility of the globe. The cyst frequently develops in the belly of one of the muscles, and other muscles in close relation to the cyst often undergo fatty degeneration. The rapid development of the proptosis is probably the reason of the failure of the lids to cover the cornea.

2. *Exploratory puncture.*—It is rarely possible to find fluctuation in these patients; the depth of the cyst and its tension account for this. It has been held by some surgeons that the dangers of puncture are so great as to forbid its use. Cirincione thinks they have been grossly exaggerated in so far as orbital cysts are concerned, and lays stress on the importance of the puncture as a help to diagnosis.

3. *Radiography.*—The shadow of such a cyst is greater than that thrown by neoplasms of the orbit except those which are bony.

4. *The examination of the blood.*—This should be undertaken in two directions: (*a*) by the hemolytic reaction of Bordet and Gengou, which is allied to the Wassermann reaction; and (*b*) by the measure of eosinophilia. The first of these methods gives positive results in 93 per cent. of cases of echinococcus. The second has been shown to be a valuable form of evidence. The increase of the eosinophile cells is very marked, and disappears rapidly after the removal of the cyst. HAROLD GRIMSDALE.

II.—PEMPHIGUS OF THE CONJUNCTIVA

(1) Cirincione, Speciale.—A note on pemphigus conjunctivæ. (Contributo allo studio del pemfigo congiuntivale.) *La Clinica Oculistica*, Settembre-Ottobre, 1915.

(2) **Stieren, Edward.—Pemphigus of the conjunctiva —Report of two cases.** *Trans. Amer. Ophthal. Society,* Vol. XIV, Part 1, 1915, p. 302.

(1) No one doubts, says **Cirincione**, of Rome, the identity of the processes which occur in pemphigus of the skin and of the conjunctiva, but the cicatrisation of the bullæ differs in the two regions. In the skin, the process is that which follows simple losses of epithelium; in the conjunctiva, three things happen, which explain the subsequent course of the disease. These are, diffuse infiltration of the subconjunctival tissue, shrinking of the tarso-conjunctival layer, and adhesion of the lid and the globe. The shrinking of the deep layers of the lid brings about entropion and trichiasis.

Cirincione has examined the bacteria found in the conjunctival sacs of four cases of this disease, and has found in the bullæ of the conjunctiva and in the conjunctiva where the disease is in process of development, a diplococcus, similar to, but differing in some respects from, that of Fraenkel. The diplococcus is not present in the blood or in the conjunctiva after the process of cicatrisation is complete.

Although Cirincione is inclined to think that this diplococcus is the true cause of the disease, he recognizes that the biological proof is not yet forthcoming. In animals the germ irritates the conjunctiva, but has never been seen to give rise to bullæ or to shrinking; but this may be explained by the different action on the eyes of men and animals. HAROLD GRIMSDALE.

(2) **Stieren**, of Pittsburg, has seen two instances of pemphigus of the conjunctiva in approximately 20,000 eye patients. The eyes of the first one, a man, aged 47 years, improved under dionin, atropin, and argyrol locally, with mercury internally, although a recurrence of his skin trouble eventually led him to shoot himself. His second case became worse despite everything that was used.

Around these two cases Stieren has written an interesting account dealing with the ætiology, the bacteriology, the pathology, and the treatment of the disorder. SYDNEY STEPHENSON.

III.—REFRACTION.

(1) **Bradburne, A. A.—Cyclophoria.** *Ophthalmology,* January, 1911.

(2) **O'Connor, R. P.—A case of anisometropia.** *Ophthalmic Record,* February, 1911.

(3) **Millikin, B. L.—Additional notes on a patient with high astigmatism.** *Archives of Ophthalmology,* March, 1911.

(4) **Golesceano, G.—Children's vision and abnormal difficulties in the choice of spectacles. (La vision de l'enfant et les difficultés anormales dans le choix des lunettes.)** *Recueil d'Ophtalmologie,* mai, 1911.

(5) **Claiborne, J. Herbert.—A hitherto undescribed term in skiascopy.** *Ophthalmology,* July, 1911.

(6) **Rowan, John.—A note on the relation of corneal and absolute astigmatism.** *British Medical Journal,* January 13th, 1912.

(7) **Todd, Frank T.—Variation in the axis of astigmatism in distant and near vision.** *Ophthalmic Record,* February, 1912.

(8) Manolescu, D. N.—A new nomenclature for anomalies of refraction and accommodation. (Ueber eine neue Nomenklatur der Refraktions und Akkommodationsanomalien.) *Klin. Monatsbl. f. Augenheilkunde*, April, 1912.

(9) Waddy, Granville, R.—The skiascopic test. A new and original explanation. *Archives of Ophthalmology*, May, 1912.

(10) Pannell, W. L.—The axis, objectively, in retinoscopy. *Ophthalmology*, October, 1912.

(11) Moxon, Frank.—Some remarks, with statistics, on the treatment of 1,305 school children (London County Council). *British Medical Journal*, October 19th, 1912.

(12) Cirincione Speciale.—Near vision of astigmatics. (Intorno alla visione in vicinanza degli astigmatics.) *La Clinica Oculistica*, Dicembre, 1913.

(13) Bartolotta.—On the estimation of the visual acuity of ametropes. (Sulla valutazione della forza visiza assoluta nelle ametropie.) *La Clinica Oculistica*, Dicembre, 1913.

(14) Ishihara, S.—Why is it impossible, as a rule, in the higher degrees of anisometropia, to wear the fully correcting glasses? (Warum konnen Anisometropen hoheren Grades in der Regel die vollkorrigierenden Glaser nicht ertragen? *Klin. Monatsbl. f. Augenheilkunde*, February, 1914.

(15) Percival, Archibald Stanley.—Errors of refraction in school children. *Lancet*, February 14th, 1914.

(16) Kimberlin, J. W.—The use of Jackson's cross cylinders in estimating refraction. *Ophthalmology*, April, 1914.

(17) Ballantyne, A. J.—The simultaneous correction of horizontal and vertical deviation, facilitated by a slight modification of the Maddox rod. *Ophthalmic Review*, June, 1914.

(18) Kniskern, E. L.—Crossed cylinders: are they a scientific aid in refraction? *Ophthalmology*, July, 1914.

(19) Mayeda, U.—Method of discovering latent hyperopia without atropine. (Methode zur Entdeckung latenter Hyperopie. ohne Atropin.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(20) Reber, Wendell.—Concerning the use of invisible bifocals in the treatment of convergent strabismus (esotropia) in little children. *Ophthalmic Review*, December, 1914.

(21) Rönne, Henning.—Transitory hypermetropia in diabetes. (Transitorische Hypermetropie bei Diabetes.) *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

(22) Zimmermann, C.—On sudden changes of refraction in diabetes. *Ophthalmology*, April, 1915.

(23) Pannell, W. L.—Some non-cycloplegic methods of refraction. *Ophthalmology*, July, 1915.

(1) The cases of cyclophoria to which **Bradburne**, of Manchester, more particularly refers are those cases in which the axes of cylinders prescribed on the basis of distant vision tests, prove to be incorrect for near vision, on account of the torsion of the eyeball which accompanies convergence to the near point. Symptoms of asthenopia are set up just as in any other instance of faulty prescription of cylindrical lenses. Bradburne advises that before prescribing, cyclophoria should be tested for at the near point by the double prism test, with the correcting glasses in position, and the desirable adjustment of the cylinder axes made.

A. J. BALLANTYNE.

(2) **O'Connor's** case was that of a woman, 49 years of age, with an alternating convergent strabismus, for which he did a central tenotomy of the left internal rectus and advancement of the left external rectus. She had the following muscular and refractive errors :—

Esotropia 26°, hyperphoria 1½°
R.V. 6/6 c. + 1·5 sph. c. +·50 cyl. axis 150°.
L.V. 6/6 c. — 3·25 sph. c. — ·75 axis 15°.

After the operation, she had binocular vision with this correction, and with +2 added, she could read the finest print, and the images of the letters seemed equal, and the binocular fixation field seemed normal in size. Six months later, she had no hyperphoria, but had 8° esophoria at 20 feet and 3° at reading distance, but this did not cause any discomfort.

J. JAMESON EVANS.

(3) The patient, a man of 39 years, first had trouble with his eyes after an attack of rheumatism at 18 years of age. For seven years, he had noticed gradual failure of vision. He had been subject to frequent headaches in the frontal and temporal regions all his life. He had worn minus cylinder glasses for two years. Glasses were prescribed for him by **Millikin**, of Cleveland, which brought his vision up to 6/9 in each eye. These were R.E.—10 D. cyl. ax. 90° combined with + 7 D. cyl. ax. 180°. L.E. —6 D. cyl. ax. 100° combined with + 4 D. cyl. ax. 10°. The glasses were made round, so that any little variation in the axes of the glasses could be very readily corrected. With these glasses the patient was able to do any ordinary amount of reading without discomfort. Five years later, he complained that for the last six months vision had been less satisfactory. Examination showed that the minus cylinder in the right eye needed to be increased to — 13 D., and in the left eye the minus cylinder required was — 8·5 D. and the plus cylinder + 5 D. With these, vision was 6/9 in the right and 6/6 in the left. These continued satisfactory for four years, and two years after this, the patient was seen again and the glasses again changed ; in the right eye, the minus cylinder became — 16·5 D. and the plus cylinder + 10 D, while in the left eye, the plus cylinder was altered to + 6 D. The + 2 D. spheres added at the previous visit for reading were continued, and these glasses were worn with entire comfort for seven years ; the patient came to Millikin again a year later, when in the right eye, the plus cylinder was changed to + 12·5 D., and in the left eye, the plus cylinder was changed to + 8·5 D. With these vision was 6/9 in each eye. The patient is still using these glasses, and finds himself able to use his eyes eight to twelve hours a day without trouble. The reading glasses have an additional + 2·5 D. spheres. The fundus has remained normal throughout.

In the right eye, then, this patient has 29 dioptres of astigmatism and 17 in the left, and is yet able to do a full day's work, requiring the constant use of his eyes, with entire comfort. He does book-keeping and night reading.

ROSA FORD.

(4) **Golesceano**, of Paris, investigated the visual function of thirty-two

boys and thirty-two girls, who presented no pathological lesions, and whose eyes were supposed to be normal. He found that 50 per cent. only had normal vision (1 to 2/3); 1·8 had good vision (1 to 2/3) in one eye, and moderate or defective vision (1/2 to 1/10) in the other. In these cases the right eye invariably possessed the better vision. Eight out of the sixty-four were emmetropic in one eye, and ametropic in the other, and in these cases the right eye had generally the better vision when it was emmetropic.

One in four showed ametropia of both eyes. Golesceano considers that the systematic examination of children's vision and the keeping of the records should be valuable as a guide in the choice of a profession for them, and, later on, would help in estimating the loss of visual efficiency in earning capacity after injuries at work.

The author notes that the amblyopia is often intermittent and variable, and may or may not be remedied partially or completely by the use of glasses. He also notes variability in refraction of children. In the production of squint, ametropia plays a more important part than amblyopia, "the fact that an eye does not see does not give rise to a static deviation of that eye." Full correction is given in myopia, both for distance and near, but the correction of high hypermetropia in children is not always well tolerated, and the author never orders an over-correction for hypermetropic children. Correction of compound myopic astigmatism is generally well tolerated, although the visual results are often poor. The accepted axis of the cylinder is sometimes not coincident with that indicated by retinoscopy.

Golesceano finds that the refraction of children is sometimes unstable owing to their psychic or general state of health. J. JAMESON EVANS.

(5) The phenomenon to which **Claiborne**, of New York, alludes appears to be elicited by rotating the mirror in such a way that the light thrown on the eye describes a circle, instead of crossing the pupil in a linear direction. The result, in the author's words, is that "either in spherical myopia or hypermetropia the shadow moves in the circle, and ultimately always in the same direction with the movement of the mirror. It resembles more than anything I know of the turning of a wheel upon an axle, or a revolving circle. The shadow chases itself around the pupil." The shadow behaves differently in astigmatism, and the author thinks that this method of turning the mirror is a valuable aid in the rapid diagnosis of the nature of the error of refraction.

A. J. BALLANTYNE.

(6) **Rowan**, of Glasgow, has worked out the relationship between corneal astigmatism, estimated with the Javal and Schiötz astigmometer, on the one hand, and the total astigmatism, estimated by retinoscopy with the plane mirror, on the other. The results follow:—

Out of the 1,000 eyes examined the absolute astigmatism and the corneal astigmatism are the same in 475 cases—that is, 47.5 per cent.; 230 were hypermetropic, 353 showed compound hypermetropic astigmatism, 89 were myopic, [illegible] astigmatism. The divisions into the different classes of hypermetropia, hypermetropic astigmatism, myopia, and myopic astigmatism, were made by the actual figures found by retinoscopy.

In each case the lens which first turned the shadows was the one noted, so that it might be said in every case there was an over-correction. In the ordinary course many of those eyes were practically emmetropic, or at least emmetropic in one meridian. SYDNEY STEPHENSON.

Todd, of Minneapolis, [illegible]

[illegible]

L. + ·50 D. sph. c.—4·25 D. cyl. axis 120°.

These were perfectly satisfactory for distance, but with correction for near work, reading was always blurred, and he preferred to read without glasses until the axis of the reading glasses were turned outward twenty degrees, when all his difficulties disappeared. His last correction for reading was:—

R. +2 D. c.—4·75 D. axis 45°.
L. +2·50 D. c. —3 D. axis 135°.

J. JAMESON EVANS.

(8) Taking Donders' schematic eye as a standard, **Manolescu**, of Bucharest, regards an eye, the refraction of which is 50 dioptres, as normal. Instead of speaking of an eye as myopic —6 D., he says it has a refraction of 56 D. Similarly, hypermetropia of + 4 D. means that the refraction is 46 D. In astigmatism the corresponding figures are given for two meridians. The figure, 50 D., is, of course, the refraction of the normal "static" eye, *i.e.*, of the unaccommodated eye. For near tests he takes 54·5 D. as the normal, which corresponds to a near point of 22 cm. If the near point is 33 cm., 50 cm., or 100 cm., the refraction figures will be 53 D., 52 D., and 51 D. respectively, and the differences between these figures and the normal, 54·5, give the strengths of the correcting glasses required. As a useful convention, he writes "Rs." for refractio simplex, the refraction of the static or unaccommodated eye, and "Rac" for refractio accommodativa, or the refraction of the dynamic or accommodated eye. He thinks that when these two figures are given they convey more information regarding the refractive condition of the eye than is obtained by any other system. A. J. BALLANTYNE.

(9) The principle upon which this explanation of the movement and locality of the shadows of skiascopy is based is that of regarding the emergent rays from the observed eye as all important. The explanation is clear, but as the figures in the text are necessary to understand it, the article is unsuitable for abstraction. ROSA FORD.

(10) If retinoscopy is performed with a correcting cylinder before the eye, a well-defined shadow is given if the cylinder is out of its proper axis. **Pannell** makes use of this fact to determine the axis of astigmatism. The cylinder is placed approximately in the correct position and is then moved slightly in one direction and in the other until a well-defined band is obtained. The position midway between these two is taken to be the axis of the astigmatism. A. J. BALLANTYNE.

(11) This article by **Moxon**, of London, is of interest more particularly to those who are engaged in school work as oculists. He gives a number of tables classifying the cases, but the greater part of the article is concerned with his method of managing the various refraction errors, and with suggestions for improvement of what one may call the "machinery" by the London County Council. S.E.

(12) **Speciale Cirincione**, of Rome, holds that astigmatics do not have any special power of irregular accommodation such as has been suggested, but that for near vision the two foci are so close that there is little distortion of the images. He shows, both by geometrical figure and by calculation, that the result of placing a convex lens between the astigmatic refracting surface and the screen is to bring the focal lines closer together, and regards the effort of accommodation as equivalent to placing such a lens in the eye.

HAROLD GRIMSDALE.

(13) **Bartolotta**, of Rome, shows that the image of a given object varies in size according to the distance of the retina from the cornea, *i.e.*, according to the refractive power of the eye. To compare accurately the acuity of various eyes it is necessary to take this factor into account.

The result of this is that in myopes the apparent acuity, as measured by

Snellen's type, for example, is greater, and in hypermetropes is less than reality. HAROLD GRIMSDALE.

(14) **Ishihara,** of Tokio, as the result of some experimental work at Jena, in which he rendered himself anisometropic to the extent of three dioptres by means of contact glasses, arrived at the conclusions: 1. That if one wears fully correcting lenses under such circumstances, there is no perceptible difference in the sizes of the retinal images; 2. That with a central position of the eyes, reading, etc., is perfectly comfortable, but 3. That diplopia and muscular asthenopia are induced when one looks through the margins of the correcting glasses, owing to the fact that the prismatic effect of the correcting glasses demands a greater deviation of one eye than of the other. The limit of the tolerable difference of the correcting glasses is determined by individual sensitiveness, by the conditions under which the eyes and glasses are used, and by the presence or absence of binocular vision.

Experience leads to the formulation of the working rule, not to correct both eyes if binocular vision is present and if the difference between the two eyes is more than 1.5 D. A. J. BALLANTYNE.

(15) The article by **Percival**, of Newcastle-on-Tyne, is not addressed to specialists, and hardly calls for abstraction in THE OPHTHALMOSCOPE.

(16) **Kimberlin**, of Kansas City, praises the Jackson cross cylinders as an aid to exact refraction work, and describes how they should be employed for determining both the strength and the axis of the correcting cylinder.

A. J. BALLANTYNE.

(17) **Ballantyne,** of Glasgow, here describes means whereby exophoria or esophoria complicated by hyperphoria may be corrected by the use of a prism obliquely set instead of two prisms, one vertical and the other horizontal. The required prism may be arrived at by the use of mathematical formulæ as given by Maddox, or by test with a modified Maddox rod. This latter consists of a red glass to which are fixed several short pieces of colourless glass rod, the two central pieces being separated by a small chink, about a third of a millimetre. The patient, when looking through this, sees a bright red spot in the middle of a less bright line when looking at a spot of light, which is seen as such by the other uncovered eye. The Maddox disc is then rotated in the trial frame until the white spot and red spot are both cut through by the red line. A prism is now found which with its base-apex line placed in the direction of the red line causes the red and white spots to coincide. In prescribing the prism correction, it should be divided by placing a prism of half the strength before each eye with axes parallel and apices in opposite directions. A. H. PAYAN DAWNAY.

(18) **Kniskern**, of Centralia, Wash., U.S.A., does not admit the alleged advantage of the crossed cylinders in arriving at accurate results in refraction work. He prefers to work out the results with the aid of the ordinary resources of the trial case. A. J. BALLANTYNE.

(19) **Mayeda**, of Nagoya, Japan, first notes the fact that the emmetrope wearing a +3 D. glass can read at 30 cm. without accommodating. He therefore, in cases of H. or H. Astig., measures the refraction error by retinoscopy, without a cycloplegic, at one metre. To the glass which turns the shadow he adds +3 D., and the patient reads with this for an hour or two. He is then tested subjectively at the distance types, gradually reducing the strength of the lenses until the best V.A. is obtained. He will be found to accept a higher lens for distance than he was able to accept at first; that is to say, the latent hyperopia has been brought to light.

A. J. BALLANTYNE.

(20) **Wendell Reber,** of Philadelphia, after giving a brief and eminently

rational review of the pathogenesis of convergent squint, discusses the treatment of accommodative and afusional, and the more frequent type consisting in a combination of these two forms. His idea is to set the accommodative apparatus at rest by means of invisible bifocal lenses, practically full correction being given for distance, and a + 2 D. or + 3 D. sphere added for the bifocal segment. Atropin (½ per cent.) is instilled once a day for the first two months, and fusion training is carried on all the time in different ways (amblyoscope, stereoscope, bar-reading, etc.) Picture books, play-blocks, alphabets of all sorts, if small, are strictly interdicted up to the fifth year. Some patience is demanded on the part of parents, and the young esotropes are apt at first to try and dodge the bifocal segment, but when these objections are overcome, "Whatever good effect the bifocal produces upon the deviation will soon follow." The bifocals are continued for two or three years, and then a full correction is worn for all purposes.

J. JAMESON EVANS.

(21) The patient who came under the notice of **Rönne**, of Copenhagen, was a woman, 47 years of age, who suffered from diabetes mellitus with 8 per cent. of sugar in the urine. Before her illness, she had been wearing +1D. for near work. One month after the onset of her symptoms, she discovered, on waking one morning, that her vision was defective, both for distance and for near. It was a month later before she was seen by the author, who then found hypermetropia of 3D., and accordingly ordered +3D for distance and +4D. for near. About fourteen days later, there was another sudden change, the glasses being now too strong, and the refraction was found to be hypermetropia of 0·5D.

Rönne offers some suggestions as to the possible cause, but this is by no means clear. He agrees with Lundsgaard, that the occurrence is probably not uncommon in these cases. A. J. BALLANTYNE.

(22) **Zimmermann**, of Milwaukee, reports briefly a case of diabetes mellitus in which myopia gave place to hypermetropia with the disappearance of sugar from the urine. He points out that the literature records instances of hypermetropia as well as of myopia resulting from diabetes, which adds to the difficulty of explaining the changes of refraction. Many explanations have been offered. It has been suggested that hypermetropia is brought about by lowered tension and reduction in the length of the eyeball due to loss of water. Myopia has been attributed to increase in the index of refraction of the aqueous. Various alterations in the condition or position of the lens have been assumed in individual cases, and changes in the power of accommodation have also been blamed. The author offers some criticism of these theories, none of which seems quite acceptable.

A. J. BALLANTYNE.

(23) **Pannell**, of New York, says it is unscientific to use cycloplegics as a routine in refraction work without selection of cases. While there are cases beyond the age of forty requiring cycloplegia to break down the "stubborn resistance" of the accommodation, there are also cases just out of their teens with "a perfectly tractable accommodation." In determining the suitability or unsuitability of cases for non-cycloplegic methods of refraction, no hard and fast rule regarding age or variety of ametropia is safe.

The two methods chosen for discussion are retinoscopy and the fogging method, but he does not exclude the use of others. In performing retinoscopy the patient is asked to look past the observer's head to a point twenty feet away, sometimes to look at the observer's forehead. The author finds that if the light is kept steadily on the pupil, and the mirror is given the smallest possible amount of movement, a condition of exhaustion is induced which causes the eye to relax its accommodation, and so to reveal the latent error. In using the fogging method he believes that a gradual *increase* of the lens (convex) by successive additions of 0·25D. is more efficacious in bringing out the total error than is the usual method of gradual reduction of the lens. A. J. BALLANTYNE.

IV.—TEST-TYPES.

(1) **Pergens.—A contribution to the history of optotypes. (Contribution à l'histoire des optotypes.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) **Pergens.—Optotypes in Oriental tongues. (Optotypes en langues orientales.)** *XVI Congrès Flamand des Sciences Naturelles et Médicales.*

(3) **Gros, Henri.—Interchangeable test-types. (Echelles visuelles interchangeables.)** *La Clinique Ophtalmologique*, 10 mai, 1914.

(4) **Titone, Porcelli.—A new test-type for the diagnosis and correction of astigmatism. (Una nuova tavola ottotipica per la diagnosi e la correzione dell' astigmatismo.)** *Arch. di Ottal.*, Aprile, 1914.

(5) **Jackson, Edward.—Cards for sight-testing in schools.** *Ophthalmic Record*, March, 1916.

(1) According to **Pergens,** of Maeseyck, Bjerrum in 1882 made use of Snellen's table and of four other boards with the same characters, but printed in clear grey. In 1882 Nicati published optotypes, from which later Landolt's *anneau* was derived. In 1884 the same author published visual types and described their application: oxyopimetry, photometry, and typometry. MARCEL DANIS.

(2) **Pergens,** of Maeseyck, continues the history of optotypes, which he commenced in the *Annales d'Oculistique* and the *Bulletin de la Société Belge d'Ophtalmologie*, by presenting optotypes in Hebrew, Sanscrit, Ben Japanese, Indian, Chinese, Arabic, and Malay. MARCEL DANIS.

(3) **Gros,** of Boulogne, describes a simple form of rotating frame, which can be made by any local smith, by means of which eight sets of type can be held in such a way as to show only one at a time. The design is probably as good and simple as any that has yet been brought out. S. E.

(4) **Titone,** of Naples, describes his test-card, as follows.—"On a white disc, which can rotate on a square board, having a side 70 cm., is printed a series of groups of parallel straight lines. All the groups have the same direction, but differ in thickness of the lines and interlinear spaces, so that the angle under which they are seen at 5 metres diminishes gradually from 11′ to 1′. The length of each line is equal to four times its breadth. Each group differs in thickness from the preceding by a fraction of a minute. In the smaller (*i.e.*, up to that subtending an angle of 8′) the difference is 20″; in the remainder the difference is 30″. Every group of lines has three defining figures; above is shown the distance maximal at which a normal eye should distinguish the separate lines. On the right is shown the angle which each line subtends at 5 metres; on the left is the degree of acuity necessary to distinguish the separate lines at 5 metres."

These figures are printed in red, to avoid disturbing the eye under examination. Further, so that the table may, if preferred, be used at distances other than the regulation 5 metres, the author has added a scale showing the value of each set of lines at various distances. The groups are not all made up of the same number of lines, so that the actual number may be counted by the examinee and this used as a test of the acuity.

The great advantage which the author claims for his types is that by their use the isolation of each meridian is as absolute as possible, and the influence of the other meridian is reduced to a minimum. HAROLD GRIMSDALE.

(5) **Jackson,** of Denver, points out that the different letters of the alphabet, even when reduced to the so-called "block letter" form, and of a size to subtend a five minute angle, vary in visibility more than one-third. For practical purposes, the view that a letter of a certain shape can be seen twice as far if made twice as large is correct. But if applied to letters of different shapes, it is misleading. For example, the latter A, if of the same shape, can be seen twice as far if made twice as high and twice as broad; but if the letter B be made twice as high and twice as broad as the A, it cannot be seen twice as far. In short, in Jackson's view, the letters of the alphabet furnish a very poor test for measuring acuteness of vision. At the same time, as he takes care to point out, they are valuable for the subjective testing of refraction.

After discussing various forms of illiterate tests, he comes to the conclusion that Landolt's broken ring (which was officially recommended as an international test of visual acuity by the Naples Congress in 1909) presents many advantages, and thinks that some such test should replace cards of test letters for all testing of sight of school children, railway men, sailors, etc. He describes clearly the method of using this international test.

SYDNEY STEPHENSON.

V.—ANOMALIES OF THE PALPEBRAL FISSURE.

Anomalies in the form of the palpebral fissure. (Zur Kenntnis der Anomalien der Lidspaltenform.) *Klin. Monatsbl. f. Augenheilkunde*, January, 1912.

Elschnig, of Prague, calls attention to a certain want of uniformity in the the nomenclature of deformities of the palpebral fissure.

The term Blepharophimosis he would limit to those forms of shortening of the palpebral fissure in which there is no abnormal adhesion of the lid margins. In the extreme forms the external commissure may be drawn in as far as the outer corneal margin, and with the eye wide open, the height of the fissure may be greater than its width. Moderate degrees of the deformity are common in old people. The skin of the lids is lax, and movable on the subcutaneous structures (there is no evidence of spasm of the orbicularis), and a slight pull on the skin at the outer canthus brings the commissure into its normal position. The condition is usually bilateral. It is caused by undue laxity of the external palpebral ligament. The treatment recommended is to raise a slip of periosteum from the malar bone, and fasten its inner (free) end to the outer ends of the tarsi. True Blepharophimosis, in Elschnig's sense of the term, may also be found after trachoma, resulting from shortening of the tarsal plates

(Blepharophimosis cicatricea). It may be combined with the form already described.

The deformity, which consists in the presence of a vertical fold of skin bridging over the outer commissure, and producing an apparent shortening of the fissure, receives from the author the name of Epicanthus lateralis. It results from spasm of the orbicularis, the external palpebral ligament being at the same time firmly fixed and unresisting. If the other conditions are favourable for its occurrence, even the normal tonus of the orbicularis may suffice to cause Epicanthus lateralis. This condition is closely related to spastic entropion, a relationship which is becoming increasingly recognised by authors.

Abnormally great length of the palpebral fissure may also be found. The author has seen it twice in five thousand cases. The outer canthus does not lie against the globe, but is drawn nearer to the outer margin of the orbit, so that in the outer third of the fissure a small cavity is formed by the drawing away of the lid margins from the surface of the globe.

A. J. BALLANTYNE.

VI.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(*Second Notice.*)

(1) **Dale, C. Bracey.—Hemianopia, optic aphasia, and alexia following post-partum hæmorrhage.** *Birmingham Medical Review*, August, 1915.

(2) **Pusey, Brown.—Family degeneration of the macula lutea, with a suggestion as to its cause.** *Trans. Amer. Ophth. Society*, Vol. XIV, Part i, 1915, p. 364.

(3) **Weakley, A. Leonard.—Metastatic endophthalmitis in a case of cerebro-spinal meningitis.** *British Medical Journal*, January 8th, 1916.

(4) **Smith, S. and Holmes, Gordon.—A case of bilateral motor apraxia with disturbance of visual orientation.** *British Medical Journal*, March 25th, 1916.

(5) **Taylor, James.—On nervous and other medical disorders as seen at an eye hospital.** *Lancet*, March 25th, 1916.

(6) **Bedell, Arthur J.—The eye-findings in one hundred patients with pulmonary tuberculosis.** *New York State Journal of Medicine*, April, 1916.

(1) Some two hours after delivery, a woman, aged 36 years, suffered from a sharp hæmorrhage, which caused collapse. On the next day, she was found to show right-sided hemianopsia. There was well-compensated mitral stenosis. At a somewhat later stage, it was found that the patient was unable to name familiar objects, although she knew for what they were used. There was also alexia. Some weeks later, the patient developed pelvic thrombosis, and, later still, thrombosis of the left femoral vein.

Dale, of Birmingham, thinks that thrombosis of the left posterior cerebral artery would account for the symptoms of the case. This lesion would result in loss of function of the left occipital cortex, thus accounting for the hemianopia, but it would not cause a lesion of the left angular and neighbouring gyri forming the visuo-psychic areas, which are supposed by the middle cerebral artery. It is assumed accordingly that the word-blindness belonged to that form known as "pure word-blindness," dependent upon a lesion of the tracts which enter the cortical centre for word-seeing from the primary visual centres. Such a lesion would be subcortical and result from the primary lesion assumed, namely, thrombosis of the posterior cerebral artery. SYDNEY STEPHENSON.

(2) **Pusey,** of Chicago, gives notes of a family of eight, of whom five became affected towards the age of thirteen years with the peculiar central ophthalmoscopic changes, to which attention was first directed by R. D. Batten in the year 1897. Since then cases have been reported by Stargardt, Jennings, Lutz, Darier, and others.

The ophthalmoscopic picture is characterised by Pusey as "that most commonly seen in elderly arteriosclerotic people, and described as senile degeneration of the macula." The family described by Pusey were unusually intelligent people. There was no consanguinity, and no history of a similar affection in the antecedents. On enquiry, it was found that several members were subject to cardiac attacks, and this led Pusey to have them all medically examined by Charles A. Elliott, whose notes are incorporated in the present communication. Briefly, the family manifested a marked tendency to cardiac angina, beginning in early life. Seven of the brothers and sisters lived to adult life and five of them were affected. Of the five with affected eyes, four were subject to attacks of cardiac distress. One alone of the five subject to the cardiac attacks was not affected with the retinal change. The mother of these children also gave a definite history of a similar trouble, and the father a less definite one.

Such attacks of cardiac distress, says Pusey, are commonly caused by arterio-sclerosis, and the ophthalmoscopic picture is that of "senile macula," a condition known to be due also to arterio-sclerosis. It is suggested, therefore, that the macular degeneration in the family described is a manifestation of premature arterio-sclerosis, to which the family shows so marked a tendency.

The change would appear to be an arterio-sclerosis of the terminal branches supplying the macular region. SYDNEY STEPHENSON.

(3) A soldier of 19 years, who had recently suffered from pneumonia, developed cerebro-spinal meningitis, as evidenced by the general manifestations of that ailment, together with the discovery of the meningococcus in the spinal fluid.

On the third day of the illness, **Weakley, R.A.M.C.,** found that signs of metastatic uveitis had developed in one of the man's eyes. The interesting point was that a pure culture of the meningococcus developed when some of the pus from the anterior chamber of the eye was inoculated into a tube of Buchanan's medium. Under general treatment by the intrathecal injection of antimeningococcus serum, repeated about every two days, the patient's health steadily improved, and the affected eye quietened down.

SYDNEY STEPHENSON.

(5) **James Taylor,** of London, possesses, one would say, almost unique opportunities of correlating ophthalmology and general medicine. The combination of physicianship to a nervous disease hospital, to an eye hospital, and to a children's hospital may not sound so very unusual, but it is by no means usual to find that the physician to the special hospital takes his duties seriously, as Taylor has done. More often, perhaps, the physician to a special hospital is apt to regard his post as purely honorary, and not demanding anything like regular attendance to assist the staff in their daily work. Moorfields is fortunate in having a physician of world-wide reputation

to attend at the hospital, and to examine a large number of medical cases. The value of such assistance to the staff of the special hospital can hardly be exaggerated.

In the present paper Taylor deals shortly with the medical cases he has seen at Moorfields during the last five years. One cannot venture on a full abstract of the paper, but the principal points of interest may be mentioned.

Taylor deals first with optic atrophy. Out of 233 cases of atrophy, 200 were found to be in connection with tabes. The remainder comprised cases following retrobulbar neuritis, many of them with signs of disseminated sclerosis ; cases dependent on a chiasmal lesion ; cases due to tobacco and alcohol, which had not recovered in the usual way ; and two or three cases of Leber's family optic atrophy. In connection with pituitary cases, Taylor says that bitemporal hemianopsia is by no means invariable, as Cushing has shown ; and that even in tumour cases in this region, optic atrophy is the rule, while neuritis is rare.

Dealing with ocular movements, an interesting reference is made to *migraine ophtalmoplégique*, as opposed to the ordinary migraine (*migraine ophtalmique*), in which there is recurrent palsy of an ocular nerve, usually the third. After each recurring attack of headache, with ocular paralysis, recovery from the paralysis is less and less complete, and, finally, the patient is left with complete paralysis of the affected nerve, and then, not infrequently, the headache ceases. With regard to the sixth nerve, Taylor hardly believes that paralysis can result, as has been held, from exposure to cold. He has watched such cases long enough to satisfy himself that they are really an early sign of a more grave affection. He has never seen sixth nerve paralysis associated with seventh nerve palsy, although the latter may admittedly be due to cold.

Thirteen cases of myasthenia gravis were seen in the five years. It is only recently that the serious nature of the disease has been recognised. It used to be thought to be functional in many cases ; but the condition is one which cannot be simulated. We are much in the dark as to the nature of this disease. The pathological findings are not constant. Collections of cells have been found in the muscles and spleen in some cases, but not in others. Sometimes an enlarged thymus has been present. The effect of treatment is very indefinite. In one case recovery, fairly complete, took place when the patient was removed to his own home.

In intracranial tumour, the diagnostic value of ocular palsy depends upon whether the nerve is affected by direct pressure or indirectly from ventricular distension. In the former event, the ocular signs have a direct localising value, in the latter this may not be the case ; so that paralysis of one or both sixth nerves in any case of intracranial tumour is in itself no indication of the site of the tumour, and even partial affection of the third nerve *by itself* is of little help in localization.

Speaking of albuminuric and glycosuric neuritis and retinitis, Taylor's view is interesting in view of recent correspondence which has taken place in the columns of the *Lancet*. "It should always be remembered, however, that in some cases it is exceedingly difficult, so far as the optic nerve and retinal condition is concerned, to distinguish between the neuro-retinitis of intracranial tumour—especially cerebellar—and albuminuric retinitis, and I have known more than one case in which it was practically impossible to say from ophthalmoscopic appearances alone which of the two conditions was present." The author considers that while albuminuric retinitis in a young person always means death within a year, it is not of such ominous significance in old people. In the latter, death may be delayed for three years. In one case the patient lived five years. But if any paralytic seizure has already taken place, the probability is that the duration of life is to be measured by months. In two cases glycosuria was associated with toxic amblyopia. Taylor considers there is no doubt that comparatively small quantities of tobacco and alcohol are effective in evoking the signs of toxic amblyopia if sugar be present in the urine. In pure diabetic retinitis—that is, in cases in which albumin is not found also when carefully looked for—the outlook as regards duration of life is probably better than in albuminuric retinitis.

Speaking of Graves' disease, Taylor concludes as follows:—"Nevertheless, in the vast majority of cases the outlook is good, and a cure, more or less complete, is confidently to be anticipated. Of the 31 cases I have referred to, not one has definitely become worse, several have been completely cured, and in most the disease seems to have become quiescent. I always prescribe belladonna, and from the manner in which the patients return for treatment, and the discomfort which they frequently say they experience when they are without it for a few weeks, I cannot but think that it is a most helpful drug in this disease."

Taylor deals in an interesting way with hemianopia. He makes the somewhat remarkable statement that in roughly 52 per cent. of the cases of hemianopia (total 22 cases) neither in the heart, the vessels, nor the state of the kidneys, was anything discovered to account for the hemianopia. Yet we must suppose that the lesion which causes the hemianopia is a vascular one. Hemianopia cases may remain well although hemianopic. In one case, that of a girl, aged 16 years, who became hemianopic after scarlet fever, the hemianopia had completely disappeared at the end of a year.

Retinal embolism and thrombosis are discussed, and the author pays tribute to the work of the late George Coats. Out of 26 cases, in only 5 was there reason to presume that the condition was really embolic.

Several interesting cases of optic neuritis are related. In one case, in a child, aged six years, it seems to have followed measles. In another case neuritis followed chicken pox. A girl, aged 11 years, had marked papillœdema and headaches. It seemed to be a case of intracranial tumour, but there was no localizing sign. The patient had, however, evidence of consolidation at the apex of one lung. She was put upon syrup of the iodide of iron, and sent to the seaside, whence she returned with the optic neuritis quite gone, the discs somewhat pale, but the vision practically normal.

The article concludes with these words:—"I have always regarded ophthalmic surgeons as amongst the most highly trained and scientific members of our profession. What I have said will have brought home to you the necessity, not only for highly specialised training in their own special work, but also the need for a broad general basis from which to work; and I hope it will also have impressed upon those of us who are not ophthalmic surgeons, how necessary it is to recognise the importance of ocular and visual signs as indications of many different kinds of medical disease."

ERNEST THOMSON.

(6) It has been claimed that eye-strain may be the cause of tuberculosis. In an attempt to reach definite conclusions, **Bedell**, of Albany, examined one hundred patients in the tuberculosis department of the local hospital. The ages of the patients ranged from 14 to 69 years; about one-third being between the ages of 30 and 40 years. The extra-ocular muscles were roughly examined; external details, including the size of the pupils, were noted; and then the vision was tested for distance and near. An hour after a drop of 5 per cent. euphthalmin had been put into each eye,

the ophthalmoscope and the retinoscope were employed. The following results were obtained: hypermetropia, 54; myopia, 3; myopic astigmatism, 12; mixed astigmatism, 7; hypermetropic astigmatism, 26; compound hypermetropic astigmatism, 39; and emmetropia, 4.

The pupils were unequal in 31 per cent. of the patients examined, as compared with 27 per cent. among the patients in ordinary practice with refraction errors. Bedell accordingly is not convinced that the symptom is of clinical value.

Bedell sets forth his results in tabular form. SYDNEY STEPHENSON.

VII.—INJURIES OF THE EYE IN WAR.

(*Second Notice.*)

(1) Wessely, K.—Ophthalmological experiences in the Field. (Augenärztliche Erfahrungen im Felde.) *Würzburger Abhandl. a. d. Gesamtgebiet d. prakt. Med.*, Vol. XV, Part ix, and *Centralbl. f. prak. Augenheilkunde*, November-December, 1915, p. 211.

(2) Terrien, F., and Vinsonneau.—Hemianopsia by war-wounds. (Hémianopsie par blessures de guerre.) *Archives d'Ophtalmologie*, novembre-décembre, 1915.

(3) Terrien, F. and Cousin, G.—Prophylaxis of wounds of the globe. (Prophylaxie des blessures du globe oculaire.) *Archives d'Ophtalmologie*, novembre-décembre, 1915.

(4) de Saint-Martin.—On ocular surgery in ambulances at the front during the first year of the war (August, 1914–July, 1915). (De la chirurgie oculaire dans les ambulances de l'avant au cours de la première année de la guerre [août, 1914—juillet, 1915].) *Ann. d'Oculistique*, janvier, 1916.

(5) Cassimatis.—Eye wounds received in war. (Des blessures oculaires de guerre.) *La Clinique Ophtalmologique*, janvier, 1916.

(6) Uhthoff, W.—Eye injuries in the German Army. *Berliner klinische Wochenschrift*, January 24th, 1916. Abs. *Brit. Med. Journal*, April 22nd, 1916.

(7) **Harwood, T. E.—Shell shock.** *Lancet*, March 25th, 1916.

(8) Ormond, A. W.—Ophthalmic injuries of warfare. *Practitioner*, May, 1916.

(1) In the demonstration by **Wessely**, of Augsburg, given to the Würzburg Physico-Medical Society on June 10th, 1915, he recounted the ophthalmological experiences gained in the field during nine months.

Facilities were afforded by the general staff, since at the commencement of the war of position on the west front they had already established central stations for soldiers wounded in the eye, and thus allowed of access to a larger circle of men. This organisation offered the advantage of the best care to the wounded and diseased, owing to the provision of special appliances and the presence of ophthalmic experts, home and foreign. Wessely rightly emphasizes the importance of being able to replace spectacles, based upon objective refraction, for which purpose Javal's ophthalmometer (found in many of the places occupied) was very useful, as was also an improvised skiascope. To-day every large *Sanitats-Formation* is provided with boxes of lenses, the contents of which allow the immediate provision of simple lenses, while those of a more complicated description can be obtained from Berlin without undue delay. Artificial eyes made of lead glass have proved themselves of service in the field. The large Hirschberg hand-magnet, which allows itself to be connected with the dynamo of the field Röntgen apparatus, has been employed. In order to test for the night blindness so frequently complained of, Wessely has made from the most simple materials an "Adaptometer," with the aid of which he has found out that a minority only of the patients suffered from an acute hemeralopia, the majority having merely a lessened adaptation. As regards disease, the author mentions the number of cases of metastatic conjunctivitis in acute articular rheumatism, and the appearance of herpes febrilis after typhoid inoculation. As to operations, Wessely emphasizes the value to be attached to excision of the sclera after destruction of the eye, and of early suture in tears of the eyelids. He saw choked disc (*Stauungspapille*) disappear quickly after trepanation. As a rare case he mentions that of an officer, suffering from a shot wound over the middle of the left clavicle. The projectile had lodged near the spinal column. Although he was otherwise well, a partial ptosis and miosis on the left side showed that the sympathetic of the neck had been involved by the injury (An analogous case was described by George Reuling on p. 118 of Hirschberg's *Gesch. d. Augenheilkunde*).

(2) It is noted by **Terrien**, of Paris, and **Vinsonneau**, of Angiers, that only 43 cases of hemianopsia caused by wounds sustained during the present war have so far been recorded by French authors. To these they add three which have occurred during their observation of over 10,000 French wounded, and the facts of which are briefly as follows :—

Cases.

Case I.—Infantryman, *ætat* 32 years, wounded in the left parieto-occipital suture and trephined ten days afterwards with some improvement in vision on the following day.

When seen by the authors six months later, there was slight head deviation away from the right with a tendency to walk in the same direction. The right pupil reactions were less active than the left. R.V. 1/60. L.V. 7/10. Reading impossible with the right eye and difficult with the left. The fields showed right homonymous hemianopsia, with preservation of macular areas. The nasal field of the right eye was very markedly contracted for both white and colours, whilst the temporal field of the left was definitely contracted, rather more for colours than for white.

Case II.—Infantryman, *ætat* 20 years, wounded in the left sub-occipital and lateral regions, was trephined nine days later and again operated on some five months after this, the nature of the second operation not being stated. Some improvement in vision, which had been practically abolished, took place on the fifth day after the trephining. Ten months later, there was slight head and walking deviation away from the right. R.V. 3/10. L.V. 6/10. Reading difficult, and could not be sustained. The fields showed right homonymous hemianopsia, with preservation of the macular areas. The right nasal field was very much contracted for both white and colours, and the left temporal field similarly contracted, but to a lesser extent.

Case III.—Infantryman, *ætat* 22 years, was wounded by a bullet entering the right occipital region and leaving by the left temporal region. The vision, much affected, began to be recovered on the eighth day after the wound. A year later, R.V. 1/10. L.V. 6/10. Reading difficult, and could not be long sustained. Right homonymous hemianopsia with preservation of the macular areas was found, with contractions in other parts of the fields, as in the two foregoing cases.

Comments.

The most interesting point in the cases, and one to which apparently attention has not hitherto been drawn, is the fact that in all three the vision of the eye away from the side of the lesion, or on the same side as the hemianopsia, suffered the more.

To corroborate this, the authors have examined the 65 cases collected by Barbazan (*Thesis*, 1914), in 32 of which the vision is recorded. Of these, the vision was equal in 21, but in 11 cases that of the eye on the same side as the hemianopsia was the more diminished, thus agreeing with the findings in those of the authors. In two of the three cases of this nature recently published by Cantonnet, the vision was noted as equal. A summary, therefore, of the cases so far published, including the present three, shows that in 23 the vision was equal in the two eyes, and that in 14 there was a difference, the eye on the same side as the hemianopsia suffering the more. Several theories are advanced by the authors as a possible explanation of their finding The one which appears to them as being a reasonable one, is that a hæmatoma occurs in the opposite cortical centre, and either destroys or causes pressure on the macular centre. The suggestion, however, hardly agrees with the generally accepted anatomical facts of the region,

As to prognosis, they think that any hemianopsia persisting for more than two months after trephining is permanent.

In treatment, immediate trephining is of value, and in cases where this procedure may not seem to be indicated, lumbar puncture may be an aid, both from a diagnostic as well as from a therapeutic point of view.

BERNARD CRIDLAND.

(3) **Terrien** and **Cousin**, of Paris, with the ingenuity characteristic of their race, suggest a simple prophylactic measure, whereby many eye injuries due to tiny shell-fragments may be prevented. Their suggestion arises from a survey of the eye cases in the Ophthalmic Centre of the Ninth Military District, and being, therefore, founded on a practical basis, carries the greater weight.

Wounds of the globe in warfare are, they say, very variable, but practically all can be divided into two main groups, as follows:—

(1) Wounds by bullets, large fragments of shells, grenades, bombs, and the like.

(2) Wounds by minute fragments of shells, grenades, bombs, etc.

Those of the first group are, of course, severe, involving lesions of the orbital wall, destruction of one or both globes, and, more or less frequently, loss of life itself. For the purposes of this article, this group is not considered.

The second group comprises wounds of the globe by small foreign bodies with a penetrating power sufficient only, in the vast majority of cases, to penetrate the anterior portion of the globe, and insufficient to perforate its posterior walls. An idea of the frequency of this class of case is revealed by the fact that in six months 561 cases occurred in this one Ophthalmic Centre in France. Of these only five were accompanied by lesions of the bony walls, although the globe itself was very frequently seriously injured, and the vision, if not abolished, was much diminished. Thus, in 561 cases, 360 had vision=*nil*, or P.L. only; 49 had vision not greater than 2/10; and 142 only had vision better than 5/10. The lesions produced were vitreous hæmorrhages, wounds of the choroid and retina, wounds of the lens, cornea, and conjunctiva, etc., in order of frequency. In 122 cases enucleation was found necessary, as a rule, several days after the injury, and due to the secondary effects rather than to the destruction of the globe at once.

Compared with the more serious wounds of Group 1, the authors find that four out of every five cases in warfare are caused by tiny fragments of projectile with a force insufficient to penetrate the posterior portion of the globe, a finding which agrees with those of other Centres.

The prophylaxis consists in the wearing of goggles, of a type not unfamiliar to motorists in this country who may find difficulty in driving in the rain. The goggles are a pair of metallic shells, convex outwards, 1mm. in thickness, and of such a size as to cover the whole of the orbital cavity and to rest on the orbital margins themselves. The "seeing part" of each goggle is obtained by two or three fine holes and several slits, one vertical and others horizontal, diverging outwards like outstretched fingers slightly separated, the middle one being actually horizontal. The shells are lined with mica, and are fitted into rubber circles which are held on in the usual way by rubber bands hooking together behind the head. They are not to be worn constantly, but to be kept handy for immediate use when a bombardment is to be expected.

One cannot help feeling that this addition to the soldier's kit cannot be very irksome, and that in the trenches, at least, the goggles should become as popular and effective in their particular sphere as the steel *casque*.

BERNARD CRIDLAND.

(4) **de Saint-Martin**, of Toulouse, gives an account of the ophthalmic cases treated in a French divisional ambulance during the first twelve months of the war.

The ambulance was mobilised on August 1st, 1914, and was active for about nine months out of the twelve. During the first two months (August and September) a satisfactory record of the cases treated was not kept. For five months the cases treated were those from a division, but for the remaining two months all the ophthalmic cases from an Army Corps were sent to the ambulance to which the author was attached. This would seem to the reviewer to make the statistics collected untrustworthy for purposes of comparison. The number of cases treated were :—

Sick, 3,879, of which 142 = 3·63 per cent. were ophthalmic.
Wounded, 4,613, ,, 73 = 1·36 ,, ,,
Total 8,492, ,, 215 = 2·5 ,, ,,

The injuries were distributed as follows :—

Penetrating wounds	30 = 41·09 per cent.
Wounds of eyelids	99 = 26·2 ,,
Contusions of globe	13 = 16·43 ,,
Penetrating wounds of cornea	8 = 10·95 ,,
Burns of the cornea and conjunctiva by explosives	7 = 9·58 ,,
Penetrating wounds of orbit	5 = 6·84 ,,
Traumatic cataracts	3 = 4·19 ,,

Of the 13 contusions, 4 = 30·76 per cent., were serious owing to complications. Of the medical patients, 88 per cent. had conjunctivitis. The remainder suffered from old fundus diseases (choroiditis, optic atrophy, or retinitis pigmentosa), or had errors of refraction.

The striking point about these figures is the large number of penetrating wounds, representing almost half the injuries of the eyes. On account of their frequency and seriousness, these deserve special consideration.

Wounds of the eyelids were usually associated with wounds of the eyeball, but when uncomplicated, they were very benign. Traumatic cataracts were rare, because ocular injuries are either very slight or so severe as to cause destruction of the anterior segment.

The author thinks that, taken as a whole, and considering the conditions of trench warfare, this percentage of 1·36 per cent. of ocular wounds does not appreciably differ from Morax's estimate of 1 per cent. in recent wars, but he adds that probably a large number of eye injuries are complicated by wounds of the brain causing death rapidly, and thus never reach the hospitals.

With regard to medical diseases of the eye, he treated only 120 cases of conjunctivitis among a force of 20,000 during six months, three of them in the depth of winter, and he justly regards this as a minimal proportion. Of these cases, 98 occurred during the months of December and January, and 13 in June. They were probably due to infection from mud carried to the eyes by the fingers, or from dust, and were of a quite ordinary type, yielding rapidly to treatment. No case of the suspicious (*suspecte*) conjunctivitis described elsewhere was observed.

The author examined a large number of cases of grave traumatism, especially of the head and face, for "distant" eye lesions, without observing any of the changes recently described as frequent by Lagrange. Among 508 head injuries he did not find a single recent lesion of the deep membranes which was not in direct association with the wound, but there were three cases of amblyopia. One of these occurred in a patient who was struck in the occipital region by a fragment of shell which wounded the soft parts, and caused a slight depression of the external table of the skull. He was unconscious for a time, and, on recovering, could see nothing. Examination of the eyes showed no lesion, and within 24 hours, vision was practically normal, but there was still slight mistiness. The author suggests that the amblyopia was due to cerebral concussion.

In the other two cases, there were injuries in the occipital region, with loss of cerebral substance, and the patients on recovering consciousness, complained that they could not see. One of them was transferred to another hospital before an examination of his eyes could be made. The other had definite œdematous optic neuritis in both eyes, and in five days, had recovered enough sight to read the sub-titles of newspapers, after which he, too, was transferred.

He has not seen any cases of ocular lesions caused by violent shock without a wound, or by the displacement of air due to the bursting of large projectiles at a short distance.

As already mentioned, 30 (*i.e.*, 41 per cent.) of the surgical affections of the eye were penetrating wounds. Of these, 22 required enucleation or evisceration immediately or after a short interval, and the author considers that eventually the majority, if not all, of the remaining 8, which seemed to be less severe, will also have to be removed. It follows that the prognosis in penetrating wounds of the eye by projectiles is very bad. On the other hand, good results were obtained in 8 cases of superficial corneal injuries, several of which were complicated by fairly severe inflammatory reaction, with iritis and hypopyon, and in 7 cases of burns of the cornea and conjunctiva caused by the bursting of shells and grenades.

From his experience, de Saint-Martin has formed the conclusion that the presence of ophthalmic surgeons in ambulances established in the immediate proximity of the firing line is not only advisable but necessary, in order that they may, by early examination and treatment, hasten the healing of slight affections of the eye, place the sick and wounded in the best possible conditions as soon as possible, and prevent the occurrence of ulterior complications. He further considers that the equipment of such an ambulance should include an X-ray apparatus and an electro-magnet with a view to (1) the early extraction of intra-ocular magnetic foreign bodies in suitable cases; (2) the substitution of amputation of the anterior segment of the eyeball for enucleation in cases in which the absence of a foreign body is demonstrated.

The author incidentally gives an account of the ocular effects of asphyxiating shells. On June 19th, 1915, about 9 p.m., some batteries situated several hundreds of metres from a school, in which two ambulances were established, were bombarded, and some of the shells exploded at a distance of two or three hundred metres from the schools. A few minutes later, those who were working in exposed positions in the schools felt a pricking sensation (*picotement*) in the eyes, at first slight but rapidly getting more intense and accompanied by lacrymation, photophobia, and conjunctival injection, with dryness of the throat in the severer cases. A little later, people in less exposed positions were similarly affected, and enquiries showed that eventually all the doctors, orderlies, and patients presented similar symptoms in different degrees. The discomfort lasted about an hour and an half, and was relieved by bathing with a lotion containing sulphate of zinc and boric acid.

It has been found that these so-called "lacrymatory" shells contain a gas consisting chiefly of bromide of benzyl. R. J. COULTER.

(5) **Cassimatis.**—Two cases of ocular injury.

In the first case a bullet passed through the mouth, carried away an incisor tooth, injured the tongue, and eventually passed out behind the ear. The sympathetic in the neck was injured and caused symptoms referable thereto, including partial ptosis. There was no direct eye injury, but the patient could not see with the eye on the corresponding side, while seeing well with the other. Cassimatis came to the conclusion that the amaurosis was of functional nature, and treated the case by suggestion. Great improvement had taken place as regards vision before the man passed out of observation two months later, although the sympathetic symptoms remained the same.

In the second case there had been no direct injury at all, the patient having been thrown down by an explosion. The optic nerves became atrophic, and there were brain symptoms. The conclusion reached is that the optic atrophy was of a descending type consequent upon cerebral lesions produced by the wind of the shell explosion. ERNEST THOMSON.

(6) **Uhthoff**, of Breslau, consulting ophthalmologist to the Sixth German Army Corps, has analysed the statistics of about 600 eye casualties in a reserve hospital to which he was attached as consulting ophthalmologist.

The proportion of non-traumatic to traumatic casualties was as 1 to 1.7. The most common of the inflammatory lesions of the cornea was keratitis dendritica—a herpetic condition; it constituted 25 per cent. of all the inflammatory diseases of the cornea, and was attributed to the strain and exhaustion of war. Though these patients remained long under treatment, the ultimate results were usually good; in some cases ordinary treatment was supplemented by superficial cauterization of the diseased cornea. In few cases was the disease apparently due to traumatism. Ulcus serpens was observed only in about 1 per cent., and the relative rarity of this disease was, no doubt, due to the soldiers being in the prime of life, and free from such complaints at the time of mobilization. Another disease found to be unexpectedly rare was gonorrhœal conjunctivitis, only one case of which came under Uhthoff's care. Yet, of other gonorrhœal complications there was an abundance in the neighbourhood. Trachoma accounted for only 5 per cent. of the 600 cases, although the territory (Russia and Galicia) from which Uhthoff drew his patients was supposed to be extensively infected with this disease; from the amount of scarring present in most cases, it was judged that the condition must have been of old standing. This relative rarity of trachoma was also noted by Uhthoff's colleagues, and he attributes it largely to the high standard of efficiency in the Army Medical Service. Iritis, which constituted about 8 per cent. of all the non-traumatic diseases of the eye, was due to syphilis in every third case, to rheumatism in every third case, and to unknown factors in the remaining third. Cases of nyctalopia represented about 3 per cent. of the non-traumatic diseases of the eye; they could also be grouped in three equally large classes: nyctalopia due to organic disease of the retina, and hereditary and idiopathic nyctalopia. There were 252 cases of direct injury to the eye, and the sight of one eye was totally lost in 46 per cent. The proportion of total blindness to blindness on one side only was as one to ten.

(7) We would call the attention of readers to a letter to the Editor of the *Lancet*, by **Harwood,** of London, in which the latter refers to the communication on Shell Shock by C. S. Myers in the *Lancet* for March 18th ultimo. It is not possible to abstract this letter without losing some of the points. It deals essentially with the necessity for extremely careful correction of refraction errors in neurasthenia. The reason why must be read in the original. S. E.

(8) **Ormond,** of London, notes that in the present war there has been less ophthalmic surgery, using those words in their usual sense and acceptation, than might be expected, for modern projectiles are capable of completely disorganising the eyeball without even coming into contact with it.

Plastic operations on the lids.

It appears that, owing to Army regulations, there is a great tendency to deal with these cases as early as possible; but Ormond becomes more and more convinced that better results would accrue if they could be left for a very much longer period before any attempt to repair the damage be made. Under present conditions a considerable amount of sepsis occurs, due to the fact that many micro-organisms that have been lodged in the deeper parts of the soft tissues are stirred into activity. It thus comes about that a carefully planned operation, which would, under ordinary circumstances, have been a success, sometimes fails, owing to the parts not being really quiet and primary union being prevented by a return of the original sepsis. It is often against the better judgment of the surgeon that early operative interference is undertaken. The author never attempts the complete transplantation of skin from one part to another. On the contrary, in the case of the upper lid he employs a pedunculated flap obtained from the forehead, and in the case of the lower lid, from the temple or cheek.

Hæmorrhages.

In cases of massive hæmorrhage into the vitreous humour, means must be taken to increase the absorption, and to prevent, as far as possible, an organization of the blood clot. Ormond makes the significant remark that the worst examples of organized masses in the vitreous have been those in which the patient has been kept at rest, and the eyes bandaged for long periods. The eyes should not be kept tied up, and the patient should be encouraged to move his eyes about as much as possible. He believes that as long as the opacity in the vitreous remains more or less fluid, and retains its red colour, there is hope of absorption. Among the means employed to further this end, Ormond recommends massage of the eye, the ionization of iodine, the sub-conjunctival injection of normal saline, and radium.

Foreign bodies in the eye.

Considering the large number of cases in which foreign bodies, often metallic in nature, are known to have remained inside the globe, the almost complete absence of sympathetic ophthalmitis is surely remarkable. The war has now raged for nearly twenty months, yet Ormond has seen during that time no definite case of sympathetic trouble, notwithstanding numberless patients with metallic foreign bodies retained within the eyeball. This fact raises the question as to the advisability or otherwise of attempting to remove metallic particles from the eye. The author is not at all enthusiastic about the removal, unless circumstances be unusually favourable. He believes that a metallic foreign body may, in certain circumstances, remain harmlessly within the eye for an altogether indefinite period. He records his conviction that, unless very carefully used, the Haab magnet is "an exceedingly dangerous instrument."

Concussion blindness.

There can be no doubt that, when cases of concussion blindness are recognized early, and the patient's mental outlook soothed and encouraged, they do not develop into the serious conditions so common in the earlier months of the war. Suggestion and hypnosis are potent aids to recovery.

Latent constitutional disease.

A large number of cases of interstitial keratitis have been met with during the last twelve months in men between 25 and 35 years of age.

Recurrent iritis, mostly associated with latent urethritis, has not been uncommon in young officers.

Total blindness.

The statistics of total blindness have not yet been published, "but are far in excess of the figures which Mr. Tennant announced a short time ago in the House of Commons."

In the earlier stages of the war a large proportion of the totally blind had been blinded by a bullet traversing the orbits horizontally and injuring one or both optic nerves or the eyeball itself. Now, however, the increased use of bombs and high explosives has resulted in the eyes being damaged by rupture of the tunics and penetration of the globe itself by metallic fragments. The eyeballs are smashed and often pulped and lacerations of the skin around the sockets are common as well. Something depends upon the nature of the ground where fighting takes place, the projectile being the same. For example, the Austrians and Italians, who fight amid the Dolomites and the Alps, have a larger proportion of blinded than the British, inasmuch as the projectile blasts pieces of rock, which in turn act as projectiles, and which are of sufficient size and sharpness to destroy the eyes completely. On the contrary, where the defence is undertaken in earthy soils, the high explosives and bombs scatter dust and sand, and so forth, without the particles being forced inside the eyeball.

SYDNEY STEPHENSON.

VIII.—REMEDIES.

(*Fourth Notice.*)

(1) **Prince, A. E.—Pasteurization in the treatment of corneal ulcers.** *Ophthalmic Record*, April, 1916.

(2) **Murphy, Frank A.—Loaf-sugar used to lacerate trachoma granules, at the same time serving as a sponge.** *Ophthalmic Record*, April, 1916.

(3) **Oliver, George H.—The toxic effects of ethylhydrocuprein on the eye.** *British Medical Journal*, April 22nd, 1916.

(1) **Prince,** of Springfield, advocates the treatment of corneal ulcers by means of heat, on the lines recommended by Weekers, of Liége (*See* THE OPHTHALMOSCOPE, 1914, page 180). With this end in view, he has devised an instrument, which he calls a "Pasteurizer," in the shape of an elongated metal egg mounted on a handle. The egg-shaped portion is heated red-hot, and held until it cools at a distance of about three-sixteenths of an inch from the corneal ulcer. The temperature should not register more than 150 degrees.

The underlying idea is based upon the fact that the amount of heat required to destroy the causative germs is less than that at which the physiological cells would be injured. Prince points out that no bacteriological examination is necessary; that all kinds of germs are killed by the radiated heat; and, finally, that the treatment is so simple that it may be administered by anybody with a steady hand.

The author relates eight illustrative cases.

SYDNEY STEPHENSON.

(2) **Murphy,** of Mason City, mechanically breaks up the granulations of trachoma by the aid of an ordinary lump of sugar. The moisture of the eye softens the sugar, so that it forms an ideal rasp to lacerate the granules, while the sugar acts as a sponge, takes up the blood, and leaves the field of operation almost bloodless.

SYDNEY STEPHENSON.

(3) Fränkel (*Berliner klinische Wochenschrift*, 1912, p. 664) used ethylhydrocuprein internally in a number of cases of pneumonia, a disease at that time epidemic in Berlin. The single dose prescribed was 0.5 gramme, and from 1 to 2.5 grammes were given daily. He found that 14.3 per cent. of the patients developed amblyopia.

Oliver, of Bradford, has had such a case under his observation. The patient, aged 40 years, had taken in all 120 grains of ethylhydrocuprein for the relief of pneumonia. He complained of roaring in the head, partial deafness, and a feeling as though a dark blind had been drawn across his eyes; and next day was unable to distinguish light from dark. At Oliver's examination (one month after the commencement of the symptoms), the pupils were two-thirds dilated, bare perception of light was present, the retinal vessels were reduced to fine threads, and both optic discs were white. Five weeks later, there was a considerable improvement in sight, and about three weeks later still, R.V.=6/18 and No. 14 J. and L.V.=6/18 and No. 4 J. Visual fields very much contracted. Colour vision obliterated. Two months afterwards, R.V.=6/9 and L.V.=6/6. Unfortunately, however, the improvement was not maintained, for eighty-one days later, B.V.=6/18 and No. 4 J. Coloured objects, 2 mm. to 3 mm. in diameter, were not recognised. Ophthalmoscopic appearances as before, but the retinal arteries and veins had a well-marked double outline, which was carried to a considerable distance beyond the disc. The patient was last examined one year after he was first seen by Oliver: B.V.=6/60; the discs were now white with no trace of colour. The retinal vessels appeared to have increased a little in size. Both retinal arteries and veins had a double contour, which extended far away from the optic disc. Pupils dilated, with very little response to light.

Finally, Oliver has seen no special advantage from the use of optoquin in serpiginous ulcer of the cornea. SYDNEY STEPHENSON.

BOOK NOTICES.

The Eyes of our Children. By N. BISHOP HARMAN, M.A., M.B.Cantab., with thirty-two Diagrams. Pages 119. London: Methuen & Co. Price 1s. net. 1916.

"This little book deals with that very important subject, the sight of the child. The eye's common defects, and the best means of safeguarding its use at school and at home, are considered. The work will be found to be free from hard words and technical phrases, so that all who are interested in children may read, understand and profit." Such is the quotation from the preface which appears on the paper wrapper outside this quite nicely bound little volume. When we have expressed the opinion that the average school teacher will find it one of the best shilling's worth of literature bearing on his or her profession that is likely to be met with in a while, we have perhaps said all that the author would wish us to say in this special journal.

ERNEST THOMSON.

The American Encyclopedia and Dictionary of Ophthalmology. Edited by Casey A. Wood, M.D., C.M., D.C.L., assisted by a large Staff of Collaborators. Volume VII—Exophthalmometer to Gyrus, Angular. Chicago: Cleveland Press. 1915.

The reviewer looked forward to the appearance of the seventh volume of the *American Encyclopedia* because it would contain the article "Glaucoma," and decided that he would make no detailed investigation of any other article in this volume.

Responsibility for "Glaucoma," 175 pp. *plus* the pages devoted elsewhere to tonometry, etc., has been shared by three writers. The Editor congratulates himself upon this fact, but, admitting that the labour would have been great, it is possible that the work of a single writer might in some ways have proved more satisfactory.

The introductory portion, including symptomatology, pathology, and prognosis, is by one writer; non-operative treatment is taken up by the Editor; while a third writer deals with operative treatment. *Pace* the explanation on page 5468 that "in such an article as this it is impossible to detail every contribution to the subject of glaucoma"—a statement which may be admitted quite freely—the writer of the first part has hardly done so well as might have been expected. Parts of the contribution are excellent, but some are obscurely written, while others are insufficiently elaborated.

The Editor's section on non-operative treatment, although necessarily short compared with the other two sections, is particularly good, and encouraging to those who think that "pacific" treatment of glaucoma does not get all the attention which it deserves. This review of the opinions of authors regarding non-operative treatment takes us up to 1914.

The writer of the section on operative treatment has set forth with considerable completeness the operative measures (good, bad, and indifferent) which have been devised. For a criterion of excellence and up-to-dateness one turns naturally to the accounts of the newer proceedings, such as the operations of Herbert, Lagrange, Fergus, and Elliot. However much the difficulties of being quite up-to-date may be conceded, one is here a little disappointed in the writer. The description of Herbert's wedge operation is simply incomprehensible, because (1) Herbert's original description left a good deal to be desired in the matter of clearness; (2) the writer has relied on a quotation from Herbert, and has failed to quote sufficient of the article to make it even as understandable as the original; and (3) illustrations are introduced which belong to Herbert's later small-flap operation, no description of which appears in the text at all. Thus, we have figures of the bent knife used in the small-flap operation and a figure of the flap, both of them suspended, as it were, in the midst of a description to which they do not refer. The Lagrange operation is succinctly described and well illustrated. Elliot's operation fares better than Herbert's, but even here, in a volume dated 1915, the description is that given (in his own words) by Elliot in 1910, with the flap extending to the corneal margin. Except in a paragraph dealing with a modification of the operation, and there only casually, no notice is taken of the fact that in 1913, Elliot, as described in his book and elsewhere, introduced the "concentric with the limbus" flap. Yet, in 1913, this was one of Elliot's "points of importance." The scientific American is usually so very up-to-date in European literature that one feels surprise at this omission to take notice of the latest modification of an operation of so much importance. The writer of the article is clearly much impressed, as, indeed, are many other ophthalmic surgeons, with the risks of late infection. The final paragraphs on the subject of trephining are by the Editor. After quoting from the article by Harrison Butler, entitled "The Tragedy of Sclerostomy," in which Butler refers to late infection as the sword of Damocles, Wood introduces the remark that, in spite of drawbacks, the Lagrange and Elliot operations have so many advantages that a return to the older procedure is highly improbable, especially in the chronic forms of glaucoma. Since a great deal of the section on trephining is taken from articles in THE OPHTHALMOSCOPE, it is worth while to point out that the number of the volume is given more than once as II whereas it ought to be XI.

Other articles of interest and importance in this volume of the *Encyclopedia* may merely be mentioned. Two of the longest are "The History of Eyeglasses and Spectacles" and "The Adjustment of Eyeglasses and Spectacles," the latter more useful to American than to British oculists: others are, "Examination of the Eyes of Soldiers, Sailors, Railway and other Employees," "Familial Eye Affections," biographical notices of Benjamin Franklin, Galen, the Graefes, and Marcus Gunn, to mention some only of the names. Two and a half pages from "King Lear" deal with the outrage on the Earl of Gloster. One feels inclined to ask whether these pages and some others in the work which could be named, might not have been more usefully occupied. The "Giant Magnet" is dealt with in some pages supplementary to the article "Electro-magnet" in which latter the newest models were not described.

This volume of the *Encyclopedia*, like its predecessors, is profusely illustrated, and its principal subject-matter is of great interest and importance, but the relation between text and illustrations might well be more precise in certain places. This defect has been referred to in a notice of a previous volume. ERNEST THOMSON.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Annual Congress, 1916.

The Annual Congress of the Ophthalmological Society of the United Kingdom took place in London on May 4th, 5th, and 6th last under the able and genial presidency of Mr. Walter H. Jessop.

The meetings for discussions (of which there were two) and the reading of papers were held at the Royal Society of Medicine, 1, Wimpole Street, W., and the clinical meeting for the presentation of cases at the Central London Ophthalmic Hospital, Judd Street, W.C. A scientific Museum had been arranged at the former place.

The proceedings on May 4th opened with an address by the President. It dealt with the ophthalmic lessons conveyed by the war, and was of an interesting and suggestive nature. Among other things, Mr. Jessop laid stress upon the curious absence of sympathetic ophthalmitis as a sequel to wounds of the eye, and, as the result of his well-known work upon papillœdema, had reached the conclusion that that condition was caused by increased intracranial pressure.

The discussion upon "Foreign bodies in the eye and orbit, with especial reference to prognosis and treatment," taken upon the first day of the Congress, was opened by Messrs. Herbert Parsons and A. L. Whitehead. It was continued by Messrs. Hill Griffith, Craig, N. Finzi, E. Treacher Collins, J. Gray Clegg, A. W. Ormond, Arnold Lawson, M. S. Mayou, Hamilton, and Bernard Cridland.

The discussion upon "The treatment of syphilitic eye affections by the newer methods," taken upon the second day of the Congress, was opened by Messrs. J. B. Lawford and S. H. Browning. It was continued by Lieut.-Col. L. Harrison, Leslie Paton, Hill Griffith, Richardson Cross, J. Gray Clegg, G. A. Berry, George Mackay, and Ernest Lane. The respective merits of salvarsan, neo-salvarsan, galyl, biargol, kharsivan, nitramine, luargol, and mercury were discussed.

On the same day the report of the Committee on Detachment of the Retina, appointed at the 1915 Annual Congress of the Society, was presented by Mr. Leslie Paton. The interesting point was brought out that, as regards cure, the British figures were better than those obtained from any other country.

Individual communications were read on May 4th and May 6th respectively, and some of these were of a very interesting nature. The only criticism we would venture to make is that the programme was somewhat overcrowded, especially on the first day of the Congress, when of eleven listed papers five only were reached.

The business meeting of the Society was held on May 4th. The Honorary Treasurer, Dr. James Taylor, informed the Society that the amount spent upon the *Transactions* during the last two years had exceeded that set apart for the purpose, and that the excess was accounted for by unnecessary proof corrections. It is to be hoped that authors will act upon the Treasurer's hint and exercise care in that direction. Indeed, if every communication were typed, considerable expense and trouble would be saved.

At the same meeting the following office-bearers were elected for the year 1916-1917 :—President : W. H. Jessop. Vice-Presidents : F. Richardson Cross, A. Maitland Ramsay, Sydney Stephenson, and Treacher Collins. Treasurer : James Taylor, M.D. Council : Elmore Brewerton, A. J. Ballantyne (Glasgow), W. Halliburton McMullen, Gordon Holmes, M.D., J. Craig (Belfast), and H. L. Eason. Secretaries : S. A. K. Wilson, M.D., and M. Stephen Mayou.

A word of praise must be accorded to the Museum, organized by Mr. M. Stephen Mayou. It contained many interesting drawings and naked eye and microscopical specimens. Special mention should be made of the hemisections of eyes lost by war injuries, exhibited by Colonel Lister. Very complete installations were on exhibit for the localization by X-rays of foreign bodies within the eye. Mr. Mayou showed a combination electro-magnet and telephone probe.

The social success of the Congress was contributed to not a little by the judicious use made of the Welbeck Palace Hotel, which is almost within a stone's throw of the house of the Royal Society of Medicine. Not only did a considerable number of extra-metropolitan members avail themselves of its hospitality at an inclusive charge per day, but a special room was put aside for smoking and writing purposes. Luncheon had been arranged at a very moderate charge per head, and many members availed themselves of its convenience. The ubiquitous President, too, had much to do with the success of the meeting.

The proceedings terminated with a cordial vote of thanks to the President, moved by Dr. John Rowan and supported by Messrs. Bickerton and Hill Griffith.

NOTES AND ECHOES.

Deaths.

IT is with deep regret that we learn of the death of Louis Verrey, the well-known ophthalmic surgeon of Lausanne, which occurred suddenly on April 11th last, in his sixty-second year. The remains were incinerated in Montoie. Louis Verrey had many friends in England, and was a member of Council of the Oxford Ophthalmological Congress. To Madame Verrey, the widow, and to Dr. Arnold Verrey, the son (who took the diploma in ophthalmology of the University of Oxford in 1912) we offer very sincere sympathy.

With regret we announce the death of L. Assicot at the age of 42 years. He succumbed to the bursting of a shell on the 18th of March last, soon after his arrival at the Fort of Douaumont. Assicot was Professor of Clinical Ophthalmology in the School of Medicine of Rennes and Ophthalmologist to the Hotel-Dieu of the same city. He volunteered soon after mobilization, and was in the retreat from Belgium. Discharged on account of his health, he was then nominated chief of the St. Malo Ophthalmological Centre. Quite recently he was sent to Verdun, where he met his tragic death.

The death is announced of Benjamin L. Milliken, of Cleveland, at the age of 64 years. He was Professor Emeritus of diseases of the eye in the medical department of Western Reserve University, and at the time of his death was President of the Cleveland Medical Library Association.

We regret to announce the deaths also of the following American ophthalmologists: Charles M. Thomas, of Philadelphia, aged 66; J. B. Burdett, of Houston, Texas.

* * * *

Appointments.

DR. PERCIVAL J. HAY has been appointed ophthalmic surgeon to the Sheffield Royal Hospital, in succession to the late Stanley Riseley.

The Leeds Guardians recently decided to appoint consulting surgeons to the Union Infirmary. At the last meeting of the board, among other appointments, Mr. A. L. Whitehead was nominated ophthalmic surgeon.

Dr. F. H. Verhoeff has been appointed assistant professor of Ophthalmic Research, and Dr. Clifford B Walker, assistant in Ophthalmology, in the Harvard Medical School, Boston.

Dr. W. J. Ryan has been appointed assistant ophthalmologist to the Philadelphia General Hospital.

Dr. David L. Tilderquist has been appointed chief of the Eye, Ear, Nose, and Throat Department of the new Medical Dispensary of Duluth.

Andrew Campbell has been appointed resident surgical officer of the Birmingham and Midland Eye Hospital. H. H. Castle has been appointed ophthalmic house surgeon at St. Thomas' Hospital.

Privat-Docenten K. Schneider and Gilbert, of Munich, have been appointed professors; and Privat-Docent Sidler-Huguenin, of Zurich, has been appointed professor of Ophthalmology.

* * * *

Pensions to Blind Soldiers.

THE German Government is granting pensions to blind soldiers amounting to from 342 dollars to 1000 dollars. Some of these are to get invalid pensions in accordance with the Workmen's Compensation Act as well. Special provision for the education of the blind is being made also.—*Ophthalmic Record*, April, 1916.

* * * *

Massage for the Blind.

A LETTER, signed "Wounded Colonel," was published in a recent issue of the *The Times* in which the writer pointed out that in Japan the blind are largely employed in massage, and experience has shown that they may be developed by training into adept operators. "Wounded Colonel" states that the need for trained *masseurs* is at present urgent in British hospitals. He speaks with experience, "having had six bones broken in various fights," and in no British hospital in France, or even in London, was the supply of *masseurs* equal to the demand. He advocated that our blinded soldiers should be trained to the profession of massage. While on this subject, readers may be reminded that some thirty blinded soldiers are already being trained in massage at St. Dunstan's, Regent's Park, N.W. We learn from Mr. C. Arthur Pearson that the more advanced of these pupils are operating daily at some of the principal London Hospitals. For that matter a school of massage for the blind is in operation at Neuilly, France.

* * * *

For Blinded Soldiers.

IN another direction the St. Dunstan's Hostel is active, *viz.* :—in collecting in America funds in aid of the after-care of blinded British, French, and Belgian soldiers. Robert Middlemiss, formerly of The King's Own Scottish Borderers, now blinded and a guest of St Dunstan's, has just received official permission to voyage to America, there to co-operate with Mr. Kessler, of New York, in his schemes for the relief of these grievously maimed men. That Americans will need no urging to help in this further work of mercy, we know from many previous experiences in this war.

* * * *

Night Blindness.

REPORTS of night blindness continue to appear in the war literature. It seems to be a question whether this condition is increasing as a manifestation of the nervous effects of trench life, or whether it is only that more cases are being discovered because of the night work required in warfare. More cases are reported in winter than summer, and the suggestion is made that the strain is greater in the cold weather and conditions in the trenches worse.—*Ophthalmic Record*, April, 1916.

* * * *

Distinction.

BEST congratulations to our correspondent, Lieut-Col. S. Hanford McKee, of Montreal, Canada, who has been appointed Companion of the most Distinguished Order of St. Michael and St. George for distinguished service in the field. The honour dates from January 1st.

* * * *

Aberdeen Eye Institution.

THE annual meeting of this Institution was held on April 26th. The number of new cases treated during the year was 2771. Of the patients 33 were treated in the institution with an average stay of 16 days. There is a deficit on the year's working of £215. The expenditure for the year was £551

THE OPHTHALMOSCOPE DIARY.

	1916.	
Midland Ophthalmological Society.	June 6th	Eye Hospital, Cheltenham.
Royal Society of Medicine: Section on Ophthalmology.	June 14th	1, Wimpole Street, W.
The Pacific Coast Oto-Ophthalmological Society.	June 22nd, 23rd & 24th, 1916	Portland, Oregon.
Oxford Ophthalmological Congress.	July 13th & 14th	Keble College, Oxford.
American Academy of Ophthalmology and Oto-Laryngology.	Dec. 11th, 12th, & 13th, 1916	Memphis, Tenn.

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THE
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A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

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ORIGINAL COMMUNICATIONS.

CONTUSION HYPOTONY.*

BY

E. TREACHER COLLINS, F.R.C.S.,

LONDON, ENGLAND

WHEN we consider how much has been written as to the causes of increased intra-ocular tension ("Glaucoma" or "Hypertony"), it is surprising how comparatively little attention has been paid to the causes of the opposite condition, decreased intra-ocular tension ("Hypotony").

This paper deals with that form of hypotony which occurs after contusions of the eyeball, in which no perforation of its coats has taken place.

The not infrequent occurrence of *minus* tension of the eye after such injuries, although known to all ophthalmic surgeons, is seldom mentioned in the text-books.

The duration of the diminished tension, in my experience, varies considerably. In the majority of cases normal tension becomes restored in the course of a few days; in others not for several weeks; and in some cases it has remained so long that it appeared probable it would be a permanent defect. In Vol. XXI of the Society's *Transactions*, in association with Dr. J. S. Hinnell, I published the notes of such a case.

It was that of a lad, aged 16 years, who was shot in his right eye by a pellet from an air gun at a distance of 14 yards. Two days later, he was seen by Dr. Hinnell, who found the vision of the eye reduced to counting fingers. There was no wound of the skin of the eyelids, but on the inner surface of the lower lid, at the junction of its inner and middle thirds, was a raised granulation, one eighth of an inch in diameter. The eyeball was generally congested, but no wound could be discovered in it. The cornea and anterior chamber appeared normal. The vitreous and lens were clear; on the anterior capsule of the latter there was a streak of blood clot. The tension was —3. It remained low, and two weeks after the injury, "optic neuritis" was noted, the amount of swelling of the optic disc being estimated as 9 D. Six months after the accident, a dark moving opacity was seen in the vitreous down and in, also, in the same direction, a small area of choroidal atrophy, and patches of pigment in the retina. There was no rupture of the choroid or detachment of the retina. I first saw the patient seven months after the accident; the appearances of the eye were then much the same. Tension—2. The optic disc and fundus around it were best seen with + 7 D. An X-ray examination showed the presence of a bullet beneath the conjunctiva, in the fornix, near the outer canthus. This I removed, through an incision in the conjunctiva, by the aid of forceps. Ten months after the accident, when last seen, the condition of the eye was unchanged, the tension being still—2 and the optic disc still swollen

This case was shown at the Society the same evening as Mr. E. Nettleship read a paper "On cases of blindness from gunshot injury to the orbit." He was much interested in my case, and in the reply to the discussion on his paper made the following remarks :—

"The case shown to-night by Mr. Collins with persistently low tension, and Mr. Ogilvie's case where an eye, with very low tension, was excised soon after the injury and no rupture of sclerotic found, both belonged to the group of indirect lesions under consideration. It was very interesting if violent vibration injuries producing intra-ocular hæmorrhage could also cause marked decrease of tension, either temporary or permanent. If that were so, he supposed it was due to some effect of the injury upon the secretion of intra-ocular fluid. It was of practical interest to know that in a case in which the tension was found *minus* shortly after a violent injury to the eye, we need not now assume that that lowered tension necessarily meant wound or rupture to the globe."

---

* [illegible]

Nearly all writers who refer to lowered intra-ocular tension after contusions of the eye have, like Mr. Nettleship, considered it to be due to arrested secretion of intra-ocular fluid.

Leplat[*] in 1890 recorded five cases of hypotony after contusions of the eye. He called attention to the frequent association with it of increase in the depth of the anterior chamber, and disturbances in the mobility of the iris and ciliary body. He attributed the hypotony to paralysis of the fibres of the sympathetic nerve which control the intra-ocular fluid.

Parsons,[†] in his "Pathology of the Eye," writes as follows:—

"The outcome of the injury to the ciliary body is the failure, more or less pronounced, of its normal functions, especially that of the secretion of the intra-ocular lymph, and this manifests itself unmistakably in a large number of cases by the diminution in the tension. Whether this is dependent upon paralysis of the nervous mechanism, rendered the more probable by the frequency of simultaneous paralysis of accommodation, but discounted by the negative evidence of experimental investigation, or upon direct injury to the secretory apparatus, must remain obscure in the present state of knowledge. The latter view has most in its favour."

One of the chief purposes of this paper is to show that there are several different ways in which a contusion of the eye may result in lowered intra-ocular tension. I propose to consider them under the following headings:—

1. Diminished secretion: (a) from nerve inhibition; (b) from vascular disturbance; (c) from epithelial damage.
2. Increased excretion: (a) through normal channels; (b) through new-formed channels.

1. Diminished Secretion.

(*a*) *From nerve inhibition.*—Although there is general agreement that the ciliary body is the source from which the intra-ocular fluid is derived, there is still much difference of opinion as to whether it is produced by secretion or by filtration. Whilst the anatomical arrangement of the parts on the inner surface of the ciliary body is such as to suggest that they have a secreting function, the experiments of physiologists seem capable of explaining the production of the aqueous humour by filtration from the capillary blood vessels, like lymph in other parts of the body. Indeed, their results would seem to imply that the lining epithelium of the ciliary body, with its complicated arrangement, is an entirely superfluous structure.

As the secreting function of the ciliary epithelium has not been definitely proved, it also remains uncertain as to whether or not there are nerve fibres having any direct action on secretion.

Writing on this matter Parsons[‡] says:—Numerous experiments have been directed to decide the action of the nerves upon the secretion of the intra-ocular lymph. The one point which is put almost beyond dispute is that there are no special secretory nerves. Stimulation and section of various nerves have considerable influence upon the secretion, but it is entirely in an indirect manner through their action upon the blood-vessels."

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[*] *Annales d'Oculistique*, T. CIII, p. 200.

[†] Vol. IV, p. 1147.

[‡] "Pathology of the Eye," Vol. III, p. 982.

The presence of vaso-constrictor fibres to intra-ocular vessels has been proved by the manometric method, but the question of vaso-dilator fibres is *sub judice* (Parsons, Henderson and Starling). The vaso-constrictor fibres run in the cervical sympathetic nerves and reach the ciliary body, after passing through the ciliary ganglion, by the short ciliary nerves. In paralysis of the cervical sympathetic, we should, therefore, expect dilation of the vessels in the ciliary body and lowering of pressure of the blood in its capillaries. It has been shown by E. E. Henderson and Starling* that "the production of intra-ocular fluid is strictly proportional to the difference of pressure between the blood in the capillaries of the eyeball and the intra-ocular fluid."

The effect on the tension of the eye of the severence of its connection with the cervical sympathetic, has been summarised by Parsons as follows:—"Section of the cervical sympathetic in cats and dogs gave a fall of about 6 mm. Hg. (Adamük, Höltzke, Graser, Lagrange, and Pachon); v. Hippel and Grünhagen failed to obtain this result."

"Extirpation of the superior cervical ganglion in dogs gave a fall of pressure of 6 mm. Hg., as estimated by Fick's tonometer (Lagrange and Pachon). The hypotony lasted well-marked for four weeks, was less in six weeks, and had disappeared in eight weeks. The same operation in man has been stated to produce a like result: Schmidt-Rimpler found that the low tension lasted five months. Abadie, Jaboulay, and other surgeons, have obtained like results. Jonnesco and Floresco obtained very striking results."

The present war has furnished us with many examples of what has been called "nerve concussion," affecting peripheral nerves,† cases where after a gunshot injury, there has been loss of mobility or sensation, due apparently to a physiological block in nerve conduction rather than an anatomical lesion. It is easy to understand that a similar inhibition of function from concussion, might occur in a nerve containing secreting or vasomotor fibres. A contusion of the eyeball producing such a block in conduction in the ciliary nerves might inhibit the vaso-constrictor fibres, bring about lowered blood pressure in the capillary vessels of the ciliary body, an arrest in filtration of fluid from them, and hypotony.

A block in the conducting power of all the ciliary nerves, both long and short, would not only affect the intra-ocular blood-vessels, but also the sensibility of the cornea, and the mobility of the muscles of the iris and ciliary body. If the short ciliary nerves only were affected, the sensibility of the cornea might be unimpaired. I have tested the sensibility of the cornea in one case of contusion hypotony, and I did not find it impaired.

The association of disturbance in the muscles of the iris and ciliary body with hypotony, in cases of contusion of the eye, was considered by Leplat. He summed up by saying that the conditions produced by such injuries in these muscles were very variable. They consisted most frequently in paralysis, but sometimes there were spasmodic symptoms.

The pathological examination of eyes which have been removed after contusion injuries has shown me that the clinical observation of loss of

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Proceedings of the Royal Society, Vol. LXXVII, 1906

† [illegible], No. 13, 1915

mobility in the iris or ciliary muscle, or the alteration in the refraction, does not justify the assumption of loss of conductive power in the nerves. The wide dilation of the pupil, which occurs when the cornea is dimpled in, and the aqueous humour forced back, will rupture the sphincter muscle. The lateral displacement of the aqueous humour, similarly produced, will rupture the fibres of the ligamentum pectinatum and ciliary muscle. Forcible displacement backwards of the iris into the circumlental space against the fibres of the suspensory ligament of the lens, may rupture some of these fibres, and lead to an alteration in either shape or position of the lens. Such lesions would readily explain loss of power in the intra-ocular muscles, or altered refraction of the eye, apart from any loss in the power of nerve conduction.

Although, then, it is possible that hypotony following contusion of the eye may be due to arrested formation of intra-ocular fluid through nerve inhibition, I do not think that as yet we can regard it as definitely proved. Judging from the effects on the tension of the eye of removal of the superior cervical sympathetic ganglion in cases seen clinically, the hypotony, if so produced, would not be permanent, and probably of not more than a few weeks' duration.

(*b*) *From vascular disturbance.*—The ciliary body derives its blood supply from two sets of arteries:—the two long posterior ciliary arteries, and the anterior ciliary arteries.

Either of these sources of vascular supply might be interfered with as the result of a contusion of the eye. In rupture of the choroid from a contusion, one of the long posterior ciliary arteries might be torn across, although I know of no anatomical evidence of such a severance having occurred.

The whole of the blood supply to the ciliary body from the posterior ciliary arteries may be cut off, by division of those vessels as they enter the globe, without any diminution in the tension of the eye taking place. In 1891 I recorded* a description of two eyes, which had had the operation of optico-ciliary neurotomy performed for the relief of pain in absolute glaucoma, in which the posterior ciliary arteries must have been divided. Both had had to be excised two years later on account of return of pain; and in both the glaucoma had persisted since the operation.

In 1912 I showed at the Society,† a boy from whom I had removed an intradural tumour of the optic nerve, with retention of the eyeball, five and a half years previously. In cutting away the nerve and tumour from behind the eyeball I must have divided the long posterior ciliary arteries. The case was carefully watched each day after the operation by Mr. A. C. Hudson, who was then house surgeon, but no diminution was found to occur in the tension of the eye.

That the anterior ciliary arteries may become torn across in contusion of the eyeball with diminution of tension, I have definite anatomical proof. In 1891 I related to this Society the case of a boy, aged 11 years, who, whilst looking up at some fireworks, was struck in his right eye by something descending. He was seen by Mr. William Lang seven days later, who described the condition of the eye as follows.—Lids slightly swollen, subconjunctival hæmorrhage and ciliary injection. Cornea hazy down and out (? burn.) Anterior chamber deep; hyphæma one-third, iris invisible. T. — 1. Projection defective above and below, good in and out. V.=hand movement. The eye was excised thirteen days after the injury, its tension at the time of removal being still *minus*.

***Royal London Ophthalmic Hospital Reports*, Vol. XIII, pp. 198 and 200

†*Transactions*, Vol. XXXII, p. 396.

Pathological examination showed that there had been no perforation of the globe. The whole of the ligamentum pectinatum, in its entire circumference, had been ruptured, so that there was a complete cyclodialysis. The anterior chamber was deepened, and on one side the iris had become drawn outwards and backwards beyond the corneal margin The separation of the ciliary body from the sclerotic had caused rupture of the anterior ciliary arteries, and the formation of an extensive blood clot in the enlarged anterior chamber. The ciliary body in this way must have been deprived of a considerable part of its blood supply and unable to form the intra-ocular fluid. Hence a condition of hypotony became established.

Another somewhat similar case is as follows.—In May, 1907, an actor, who had recently returned from America, came to see me at Charing Cross Hospital. Three weeks previously, while in Boston, he had been attacked one night by some ruffians from behind, and received a severe blow on his right eye. He did not know if the blow was from the man's fist, or from something the man held in his hand. Since the injury, the eye had been blind and painful. On examination, I found the tension of the eye *minus*. The cornea was opaque and of a dull greenish colour, most intense near the centre. Nothing could be seen through it. I excised the eye, and in doing so found that the orbital tissues were abnormally adherent to the sclerotic, about the equator on its outer side. On examination of the eyeball, after its removal, a small pucker in the sclerotic was seen in this region running concentric with the corneal margin. The eyeball, after being hardened and frozen, was opened by an anterio-posterior section which passed through the pucker in the sclerotic. It was seen to be due to a scar, situated behind the insertion of the external rectus tendon, in which the posterior divided end of the sclerotic lay inside the anterior.

On the nasal side of the globe the ciliary body was displaced backwards, and was widely separated from the sclerotic; the ligamentum pectinatum and the anterior ciliary arteries in that situation had been completely torn through. On the outer side the iris was much pressed back, and there was considerable disorganisation of the pigment epithelium lining it, and that of the ciliary body in its neighbourhood; the ligamentum pectinatum, however, on this side was intact. Extensive blood clots filled both the anterior and vitreous chambers. The lens was displaced outwards, and the retina was detached. The detachment at the inner side did not end anteriorly at the ora serrata, but extended forwards, involving the pars ciliaris retinæ as far as the ciliary processes I quote this case as one showing a cyclodialysis, with rupture of the anterior ciliary arteries, the result of contusion. It is, however, uncertain to what extent the hypotony was attributable to these lesions, as there had also been a perforation of the globe. The history of the injury rather suggests that the scar found in the sclerotic was the result of a rupture, but the position of the scar at the equator is further back than I have ever known an indirect rupture situated, and the possibility of a perforating wound cannot be excluded.

I have never seen a perforating lesion which I could regard as an indirect rupture of the sclerotic situated elsewhere than in the region of the canal of Schlemm.

It has been suggested that hypotony following a contusion of the eye might be due to an indirect rupture of the posterior part of the globe, which could not be seen clinically. I have never met with such a condition in any injured eye that I have examined pathologically, and doubt the possibility of its occurrence.

In cases of cyclodialysis and rupture of the anterior ciliary arteries there must always be, as in the two cases above quoted, extensive hæmorrhage into the anterior chamber.

Where, after a contusion of the eye, extensive hæmorrhage intc the anterior chamber and *minus* tension co-exist, rupture of the anterior ciliary arteries may, I think, be regarded as the most probable cause of the hypotony.

The case described at this Society by Mr. F. M. Ogilvie in 1900* would, I think, come under this category. It was that of a man who shot himself with a revolver in the right temple, and was seen by Mr. R. W. Doyne four days later, who found that he had no perception of light in his right eye; that there was blood in his vitreous and anterior chambers; and that the tension was — 3. The eye was excised. Examination of it after its removal showed no perforation of its tunics. There was some evidence of bruising at one spot, but no perforation, nor had the optic nerve been divided by the bullet. Unfortunately, no examination of the parts in the interior of the eye is recorded. X-ray examination localized the bullet as lying in the left orbit, almost in contact with the posterior and inner side of the left eyeball. Ophthalmoscopic examination of the left eye showed the appearance of a punched-out hole at the macula.

A contusion of sufficient force to produce cyclodialysis nearly always causes considerable derangement of other parts in the interior of the eye. The suspensory ligament of the lens is often torn and the lens dislocated. The lens capsule may be ruptured and the lens become cataractous. The vitreous humour may be displaced and the retina detached.

A characteristic symptom of cyclodialysis, after the blood effused into the anterior chamber has become absorbed, is the apparent complete disappearance of a portion of the iris, as though an iridectomy had been performed. What happens is, as noted in the case of a boy injured with a firework already referred to, that a portion of the iris becomes retracted by the ciliary muscle away out of sight beyond the sclero-corneal margin.

The symptom of disappearance of a portion of the iris, together with persistent hypotony, was present in the following case:

William C., aged 14 years, on May 3, 1901, was cleaning a revolver when a blank cartridge exploded and struck his right eye. He came under my care at Moorfields Hospital the next day. I found that both eyelids on the right side were œdematous and that the right eye was proptosed. On the inner side of the ocular conjunctiva there was a track of blackened conjunctiva, and beneath the conjunctiva, up and in, a hard foreign substance could be felt. The cornea was steamy, and there was a large hyphæma. The pupil was dilated, inactive, and eccentric. The tension slightly *minus*.

An incision was made in the ocular conjunctiva over the foreign body, and by means of forceps, a cartridge case, three-quarters of an inch long and a quarter of an inch in diameter, was drawn out, its base being most deeply implanted. It lay external to the sclerotic, between it and the conjunctiva, and had not perforated the globe.

The œdematous swelling gradually subsided, and three weeks after the removal of the foreign body, the condition of the eye was noted to be as follows: V.=bare p.l.; T. *minus*; pupil widely dilated, iris tremulous, down and out a portion of the iris had disappeared from view, the appearance being similar to that of a coloboma; no red reflex to be obtained from the fundus; on oblique illumination, something seen to float in the vitreous chamber. The condition of the eye remained much the same for several months; the vitreous cleared somewhat, so that a red reflex could be obtained up and in, but not elsewhere. On December 12th, 1901, seven months after the injury, the tension was noted as—3. In the course of the next year, the lens became cataractous.

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* *Transactions*, Vol. XX, p. 198.

The evidence in this case is, I think, strongly in favour of the hypotony being due to arrest in formation of intra-ocular fluid from rupture of the anterior ciliary arteries.

(*c*) *From epithelial damage.*—If the epithelial lining of the ciliary body, as its arrangement suggests, has the function of secreting the aqueous humour, it is conceivable that a contusion of the eye might produce a direct inhibitory action on the cells themselves; so causing arrest of secretion and hypotony. There is, however, as yet not sufficient evidence as to the real function of these cells to enable us to verify the truth of such an hypothesis.

In eyes which, as the result of contusion, part of the suspensory ligament of the lens has been ruptured and the vitreous humour has come forward into the circum-lental space, I have sometimes found a detachment of the pars ciliaris retinæ, as well as a detachment of the retina. I have met with a similar condition in cases of indirect rupture of the globe. In both classes of cases it appears to have been brought about by the traction of the suspensory ligament and displaced vitreous humour. The pars ciliaris retinæ having in this way been peeled off from the pigment epithelium of the pars plana of the ciliary body. I have not found the detachment to extend further forwards than to the root of the ciliary process. The condition was present over an extensive area on the inner side of the ciliary body, on the same side as the cyclodialysis, in the case of the actor already referred to, who had received a blow causing perforation of the globe on the outer side. I found it present to a less extent, in the case of a boy, aged 10 years, who four days previous to the removal of his eye, had struck it with a stick of a catapult with which he was shooting. The tension of the eye was *minus*. There was no perforation of the globe, but an iridodialysis; a rupture of part of the ligamentum pectinatum and of some of the fibres of the ciliary muscle; a rupture on one side of the suspensory ligament and of the lens capsule, with some displacement forwards of the vitreous humour between the lens and the ciliary body, in the region of the ruptured suspensory ligament. The anterior part of the retina, and the pars ciliaris retinæ over part of the pars plana of the ciliary body, were detached, on the same side as the iridodialysis and ruptured suspensory ligament.

Where a contusion injury is of sufficient force to detach the pars ciliaris retinæ, there are always other lesions, to which, as this paper will tend to show, the resulting hypotony might be attributed. It is impossible, therefore, to say definitely what influence a detachment of the pars ciliaris retinæ alone has on the intra-ocular tension, although it would seem highly probable, that so extensive a change in the part of the eye from which the intra-ocular fluid is derived, would tend to arrest its formation.

2. Increased Excretion

(*a*) *Through normal channels.*—E. Henderson and Starling* found, in experiments on animals, that if they raised the intra-ocular pressure artificially to 50 or 60 mm. of Hg., the escape of fluid by filtration from the eye became easier, "as if additional channels had been opened up or pre-existing channels enlarged."

Wesseley† applied direct pressure to the sclerotic of the eyes of animals

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by means of a pair of flat hooks passed into the orbit. In this way he states that he reduced the bulk of the vitreous to such an extent that the eye became quite soft, and did not regain its normal tension for four or five days after the pressure was removed.

The pressure on the eye during the use of Schiötz tonometer will produce a reduction of tension. A. J. Ballantyne* says:—"With regard to the results of applying pressure to the globe, it is well known that, if the application of the tonometer is continued for a number of seconds, there is a gradual fall of the pointer. The most plausible explanation of this is that the pressure has rendered the globe softer by expressing fluid through the normal filtration channels. There is, therefore, no reason to hope that the phenomenon may provide us with a way of ascertaining the efficiency of the filtration."

Montague L. Hine, by the use of Schiötz tonometer, has been able to show that after the instillation of eserine into the healthy eye, the tension becomes slightly decreased. Presumably, the eserine, by contraction of the pupil, has the power of opening up pre-existing channels of excretion, so that filtration through them is facilitated.

The application of a compressive bandage to the eye will bring about a decrease in tension, varying in amount according to the degree of pressure it exerts. Lowering of tension so produced might be due to squeezing of blood out of the intra-ocular blood-vessels, or to expression of the intra-ocular fluid. That it is mainly due to the latter is rendered probable by the experiments of E. Henderson and Starling already referred to.

If, as the above experiments tend to show, the normal channels of exit for the intra-ocular fluid are capable of adapting themselves to an increased rate of excretion, and if this increased rate of excretion can be produced by prolonged gentle pressure on the eyeball, it seems likely that a short violent compression might act in a similar way.

Hypotony so produced by contusion of the eye, would probably be of only short duration, at the most not lasting more than a few days, and certainly not being permanent.

(b) *Through new-formed channels.*—All who have had much experience of the operation of sclero-corneal trephining for glaucoma are aware, that sometimes the newly-formed channel affords such free exit for the escape of the intra-ocular fluid, that the tension of the eye becomes less than normal. I think it will be generally admitted, that the larger the circumference of the trephine used, the more likely is such a condition to be established. My own experience is: that it is rare to get *minus* tension from the use of a trephine 1·5 mm. in diameter.

At this Society in 1911,† and elsewhere‡ on subsequent occasions, I have pointed out how the peculiar features of a filtration scar can best be explained, by regarding it as one in which a permanent gap has been established in the endothelial lining of Descemet's membrane at the periphery of the cornea. The operation of sclero-corneal trephining, by removing a circular piece of Descemet's membrane, is one of the most effectual ways in which such a permanent gap can be produced. The larger the area over which the endothelium is removed, the greater the facility for the escape of fluid from the anterior chamber, and the greater the likelihood of the establishment of hypotony.

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*XVIIIth International Congress of Medicine: Ophthalmology, Part II, p. 201.

†*Transactions*, Vol. XXXI, p. 208.

‡Ophthalmic Section, XVIIth International Congress of Medicine, Part 2, p. 23, and THE OPHTHALMOSCOPE, Vol XII, p. 589.

Pathological evidence as to the truth of this hypothesis is afforded by a case recently described by Verhoeff.* He examined microscopically a filtration scar, 52 days after the operation of sclerectomy had been performed with his punch. The eye had had to be enucleated on account of a sarcoma. No endothelium was found lining the inner surface of the œdematous tissue through which filtration had been taking place.

On June 29th, 1915, H. L. Eason brought to me a boy, 6 years old, who two and a half years previously had run against a lamp-post, and struck his left brow. A year later a swelling was first noticed at the upper part of his left eye. Mr. Eason had had the boy under observation for a year previous to his coming to me, during which time he said the condition of the eye had remained much the same. I found the vision of his left eye = 6/60 and unimprovable by glasses. T. — 2. Cornea clear; iris and pupil normal. Above the cornea and a little to the outer side, the conjunctiva was œdematous. In the centre of the œdematous area there was a clear spot in the sclerotic, which looked like a fistula. On ophthalmoscopic examination, the optic disc and parts around appeared swollen, the retinal vessels being arched forwards. The amount of the swelling I estimated as = + 5D. Mr. Eason said this swelling of the disc was not present when he first saw the boy.

The appearances in this case were very similar to those seen after a sclero-corneal trephining, and yet no perforating wound had been inflicted. I think the most probable explanation of the condition is, that as the result of the contusion an incomplete internal rupture of the sclera had taken place. The occurrence of such incomplete internal ruptures has been demonstrated by Fuchs.† He says that sometimes the ligamentum pectinatum is alone injured. At other times it extends to the canal of Schlemm or a little further, the innermost scleral lamellæ being torn, while the outer layers remain intact. Fuchs describes one of the distinctive clinical features of incomplete scleral rupture to be a bluish-black line near the limbus running concentric with it. In the specimens of the condition which he examined microscopically he found that the iris lined, and was intimately adherent to, the ruptured area. This adhesion of iris would account for the bluish-black line and also, as Fuchs points out, for the occurrence of increase of tension, which was present in some of his cases.

In Mr. Eason's patient no bluish-black line was seen, and there was nothing abnormal in the condition of the iris. It would appear, therefore, to have been an internal scleral rupture without adhesion of the iris, and one in which an area would have been left at the periphery of the cornea unlined by endothelium. Through such a rupture filtration of aqueous humour would take place, causing an œdematous condition of the overlying conjunctiva and hypotony.

In 1891,‡ at this Society, I described a different form of rupture of the ligamentum pectinatum, occurring in contusions of the eye, from that to which Fuchs refers. In it, those fibres of the ligament which curl round the angle of the anterior chamber to go to the root of the iris, the so-called pillars of the iris, are torn across and the ciliary muscle becomes split. Its longitudinal fibres being separated from the circular fibres, so that the angle of the chamber is considerably prolonged outwards. The rupture of the pillars of the iris and splitting of the ciliary muscle may be present, in the entire or in only part of the circumference of the anterior chamber. The only appearance to which it gives rise clinically is marked deepening of the anterior chamber.

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I have found it pathologically several times, associated with hypotony clinically. The rupture of the bonds of union between the root of the iris and the periphery of the cornea, must considerably facilitate the passage of the intra-ocular fluid into the canal of Schlemm, and so tend to lower tension; much in the same way as the instillation of eserine, by facilitating excretion, lowers tension.

Quite recently I have seen two soldiers who had reduced tension of the eye, as the result of contusion from a projectile, without any perforation of the globe. The two cases presented very similar appearances clinically. In one I excised the eye, and am able to demonstrate to you the pathological changes. The other patient is still under my care in the Hospital, and I am able to present him to you for your inspection. The notes of the two cases are as follows:—

Private T. H., aged 42 years, was on February 14th, 1916, struck in his right eye by a piece of the case of a shrapnel. He thinks it was a large piece that struck him and that it afterwards fell down. He immediately lost the sight of the eye, and it had remained blind since.

I first saw him at Charing Cross Hospital on February 23rd. I found the lower and outer part of the ocular conjunctiva bloodstained and injected. I could not make out definitely whether these appearances were the result of a bruise or a perforating wound. The pupil was eccentric, being displaced upwards and inwards to such an extent that there was only a very narrow piece of iris visible at the periphery of the anterior chamber in that direction. The pupillary border of the iris up and in appeared slightly bent backwards. On examination with reflected light, a small area could be seen in the iris, to the inner side of the part where it was narrowest, through which a red reflex could be obtained. There was hardly any responsive action of the pupil to light. The anterior chamber was of unequal depth but generally shallower than normal; it contained a few strands of blood clot. No details of the fundus could be seen ophthalmoscopically, and hardly any red reflex could be obtained. By focal illumination, large blood clots could be seen in the vitreous. The tension of the eye was —1. An X-ray examination by Dr. Ironside Bruce showed that there was no foreign body in the eye. The patient had only bare perception of light and complained of much pain in and around the eye. Five days later it was excised.

After being hardened in formaline, the eyeball was frozen and divided by an anterio-posterior section, passing obliquely downwards and outwards, so as to cut through the seat of injury and the pupil where it was most eccentric. Sections of one-half of the globe were cut for microscopical examination. There had been no perforation of the tunics of the globe at the seat of the injury down and out. On the opposite side, where the iris was narrowest, it was found to have been drawn backwards and outwards, this retraction being permitted by a rupture of the ligamentum pectinatum in that locality. Some sections passed through one of the anterior ciliary arteries; the rupture had extended through the ligamentum pectinatum up to it, but having offered greater resistance, the artery had remained intact. This accounts for there having been only slight hæmorrhage into the anterior chamber. The tilting back of the tip of the iris where it was most displaced, which was noticed clinically, was very evident in the sections. About the middle of the iris, in some sections, a small area was found where there was a gap in the pigment epithelium on its posterior surface. This doubtless accounted for the red reflex which could be obtained through it in one place by reflected light. The stroma of the iris in this region was swollen, showing many enlarged lymph spaces. The suspensory ligament of the lens was torn across, up and in, and the margin of the lens in this region was slightly tilted backwards. On both sides of the globe there was a thin layer of blood clot in the lymphatic spaces between the choroid and sclerotic. The retina, up and in, had become torn through at the ora serrata. Its free torn edge, and the part immediately adjacent, floated inwards away from the ciliary body and choroid. There was also some detachment of the retina on the opposite side of the globe. There were extensive blood clots in the anterior part of the vitreous.

Charles W., aged 20 years, a soldier, was on March 2nd of this year, struck in the face by several fragments caused by the explosion of a "Whizbang." The sight of his right eye went immediately after the injury. He was sent to Boulogne where he remained in hospital until transferred to Moorfields on March 24th, and the following notes were taken by Mr. Joynt, the senior house surgeon. He had not suffered from any pain in the eyes; and his general health was quite good. On both sides of his face there were several small, scattered, suppurating sores, produced by abrasions of the skin. In the right eye there was a moderate amount of both conjunctival and ciliary injection. The cornea was clear and there was no sign of any wound either in it or the sclera. The anterior chamber was shallow. The pupil was dilated to about 2-3rds, inactive to light, and displaced outwards to such an extent that its outer margin could not be seen. The appearance produced suggested that of a coloboma of the iris outwards. There was a linear band of blood clot in front of the iris, just below the margin of the pupil. The lens was displaced inwards and a little backwards, and its outer border could be clearly seen where the iris was retracted. By reflected light, irregular greyish opacities were seen in the lens, and some blood clots in the anterior part of the vitreous. No view of the fundus could be obtained, due to the condition of the media. The tension was — 1, and the vision equal only to counting fingers at one foot. His left eye was unaffected. When placed in front of the Haab's magnet, nothing happened. An X-ray examination gave no evidence of the presence of any foreign body in the eye, although there were several shown situated about the face. A piece of metal (which was magnetic) was removed from one of the septic areas in front of the right ear.

Pathological examination of the eye in the first of these two soldiers showed rupture of the ligamentum pectinatum over a limited area, without rupture of the anterior ciliary arteries. The similar symptoms of localized retraction of the iris, without extensive hæmorrhage into the anterior chamber, in the second case, makes it probable that a similar lesion was present. As the anterior ciliary arteries were intact, it seems improbable that the hypotony was due to diminished secretion. I think it can best be accounted for by increased excretion, due to the greater facility with which the aqueous humour could find access to the canal of Schlemm from the rupture of the pectinate ligament.

Another way in which contusion of the eye may produce a new-formed channel for escape of the aqueous humour from the anterior chamber is by rupturing Descemet's membrane. Such ruptures have been shown to occur by Thomson and Buchanan, at the time of birth, usually from instrumental delivery. The gap formed in the endothelium of Descemet's membrane in these ruptures allows the aqueous humour to filter into the substantia propria of the cornea, and renders it opaque. In the description of the cases of this sort, given by Thomson and Buchanan, no mention is made of the tension of the affected eyes, probably because of the difficulty of estimating the tension in newly-born infants' eyes. In these ruptures of Descemet's membrane the gap formed in the elastic lamina soon becomes bridged over by a newly-developed endothelium; any further filtration through the gap is then arrested, as is shown by the disappearance of the corneal haze. If, then, hypotony should result from such a lesion, it would only be of temporary duration. When, however, hypotony is caused by either of the previous-mentioned conditions, *viz.*, internal scleral rupture, or rupture of the pillars of the iris and ciliary muscle, it might be permanent. Separation of the structures severed in these injuries is wider, and the chance of them becoming covered by endothelium less probable.

Conclusions.

1. That hypotony following contusion of the eyeball may be due to different causes, and that more than one cause may be present at the same time.

2. When of short duration, it is probably due to an increased rate of excretion of the intra-ocular fluid through the expanded normal channels of exit; or, possibly, to some arrest of secretion from paresis of the vaso-constrictor nerves.

3. When of long duration, it may be due to:—

(*a*) The formation of new channels of exit for the intra-ocular fluid from the anterior chamber either from an internal scleral rupture or rupture of the pectinate ligament.

(*b*) The cutting off of blood supply to the ciliary body from rupture of the anterior ciliary arteries.

(*c*) Or possibly the detachment of the pars ciliaris retinæ.

4. If accompanied by extensive hæmorrhage into the anterior chamber, either the canal of Schlemm has been opened up by an internal scleral rupture, or the anterior ciliary arteries have been torn across from cyclodialysis.

5. If, when the blood has cleared away, a portion of the iris has disappeared from view, as though an iridectomy had been done, then there has been cyclodialysis with rupture of the anterior ciliary arteries.

6. If, in course of time, a translucent area appears just outside the sclero-corneal margin, like that seen in a cystoid cicatrix, then there has been an incomplete internal rupture.

7. If the anterior chamber, without extensive hæmorrhage into it, becomes markedly deepened in the whole or part of its circumference, there has probably been a rupture of the ligamentum pectinatum, limited to the pillars of the iris, and of the ciliary muscle, prolonging the angle of the anterior chamber outwards.

8. If the lens is dislocated laterally, and the retina detached, the vitreous humour has probably come forward into the circumlental space, and may have dragged the pars ciliaris retinæ away from the pigment epithelium.

SOME OBSERVATIONS WITH THE SCHIÖTZ TONOMETER ON THE NORMAL EYE.*

BY
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RECENTLY, at the suggestion of E. Treacher Collins, I made a number of observations with a Schiötz tonometer on normal eyes under varying conditons. These observations were made on children of ages varying from 10 to 16 years of age, as these were readily available, under suitable conditions, for an investigation lasting some four months. the time for this work being limited.

Although some fifty picked cases were examined, it has been impossible to record more than twenty-six of them here, as when the child proved too restless for trustworthy readings to be taken, or the same result was not obtained on at least two different occasions, the observations had, of course, to be discarded as valueless. I have certainly been able to appreciate all the difficulties, mentioned by Priestley Smith[1] in his recent article "On the Limitations of the Tonometer," which tend to invalidate any results obtained by this method, but I have tried to eliminate error, as far as possible, by making several observations, at different times, on the same child. It is, I think, unlikely that one would be able to get as high a proportion of satisfactory readings amongst children as at the Metropolitan Asylums Board's Ophthalmia School, at Swanley, since these patients are extremely well disciplined and used to having their eyes treated in various ways.

On commencing the investigation, which was originally undertaken to determine the influence of eserine on the normal eye, I did not know of the previous work on the subject by the same method by observers in Europe and America, but later found that my results corresponded closely with theirs, and as this work does not seem to be very widely known in this country, in order to call attention to it, and to record what, I think, is a fresh observation, it has been thought worth while to bring these results, as far as they go at present, before the Society.

As regards the application of the instrument, it is unnecessary to enter into details here, since they should be well known, but I should like to call attention to two points.—The first has already been noted by many observers, such as A. J. Ballantyne[2] and Lieut.-Col. R. H. Elliot[3], in this country, and Schoenberg[4], in America, and is that the continued or repeated application of the tonometer, mechanically, by its weight, lowers the intraocular pressure definitely in a very short time, so that it is the first reading on any given occasion that is trustworthy, provided the patient's eye is steady and the gaze suitably fixed on some distant object vertically overhead, or, in the case of convergence, at the tip of a finger held twelve inches from the nose. The last is, I think, important, as will be shown later, and seems to be one which has not hitherto been recognised by all observers. There is another reason, especially when one is dealing with children, why it is the first reading that is reliable under favourable conditions, *viz.*, that repeated observations, or any prolongation of the examination, tends to make the patient restless, however good he (or she) may be, although occasionally one comes across an exception to the rule.

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* [illegible]

The second point is one to which Priestley Smith[1] draws attention in the article previously mentioned, and is that faulty results may very readily be obtained by malposition of the tonometer on the cornea, and these can only be eliminated by practice, care, and repeated observations on the same patient. I note this fact especially because I wish to point out that the two most probable faulty positions of the eye in relation to the tonometer, when the eyes are converging, would, according to Priestley Smith, give a very slightly higher scale reading (and therefore a lower intra-ocular pressure) than the normal, and any error thus introduced would tend to diminish, rather than to exaggerate, any difference in pressure due to convergence.

In the table shown below, upon which this communication is based, I have given the actual scale readings, as well as their translation into millimetres of mercury, taken from the chart accompanying the instrument. In the body of the paper, however, I have used the translation as being more convenient and more intelligible, it being immaterial in this case whether the conversion is scientifically accurate or not, as we are here dealing with comparisons between the normal intra-ocular pressure and the intra-ocular pressure of the same eye under varying conditions.

Before detailing the observations, I should note also that all the eyes were anæsthetised with cocaine hydrochloride, 4 per cent. solution, as this was more readily obtained than holocaine, the error thus introduced being constant through the series. According to Lübs[5], who used holocaine, cocaine reduces the intra-ocular pressure in normal eyes from 1 mm.—4 mm. Hg, and his results have been confirmed by many others.

The observations so far made are as follows :—

1. The intra-ocular pressure of the normal eye gazing at a fixed spot on the ceiling.
2. The intra-ocular pressure of the same eye gazing at a finger held 12 inches from the nose.
3. The intra-ocular pressure of the same eye under the influence of eserine.
4. The intra-ocular pressure of normal eyes at varying intervals after the removal of a pressure bandage.

Intra-ocular Pressures of Normal Eyes (with Schiötz Tonometer).

Case No.	Normal i.o.p. Scale Reading		Converging. Scale.		With Eserine Scale.	
		mm. Hg.		mm. Hg.		mm Hg.
1	3·0	25	——		4·0	21·5
2	4·0	21·5	3	25	6·0	15·0
3	5·0	18·5	——		6·0	15·0
4	4·0	21·5	1·5	32	6·0	15·0
5	3·0	25	—		4·25	20·5
6	3·25	23·75	2	29·5	4·75	18·75
7	3·75	22.25	2	29·5	6·0	15·0
8	3·25	23·75	2·25	28·5	4·0	21·5
9	4·5	19·5	3	25	7·0	13·5
10	2·5	27·5	——		4·0	21·5
11	5·0	18·5	3·5	23	6·0	15·0

Case No.	Normal i.o.p. Scale Reading	Normal i.o.p. mm. Hg.	Converging. Scale.	Converging. mm. Hg.	With Eserine. Scale.	With Eserine. mm. Hg.
12	3·0	25	2·5	27·5	4·0	21·5
13	2·75	26	——		3·5	23·0
14	4·0	21·5	——		4·75	18·75
15	2·5	27·5	——		3·0	25
16	3·5	23	——		5·0	18·5
17	4·0	21·5	2	29·5	4·0	21·5
18	4·0	21·5	——		4·0	21·5
19	2·0	29·5	——		3·5	23·0
20	3·0	25	2·5	27·5	4·0	21·5
21	4·0	21·5	——		4·0	21·5
22	2·5	27·5	1·5	32	2·5	27·5
23	3·0	25	2	29·5	5·5	17·5
24	4·5	19·5	4	21·5	7·0	13·5
25	4·0	21·5	3	25	4·5	19·5
26	2·5	27·5	2	29·5	4·0	21·5

Taking the findings in detail :—

(1) The normal intra-ocular pressure was found to vary from 18·5 mm. Hg. —29·5 mm. Hg., the mean being 23·5 mm. Hg.

Lübs,[5] when fixing the normal intra-ocular pressure at 13 mm.—26 mm Hg., states that in three-fourths of the adults tested, it varied from 18 mm.—31 mm. Hg., while age appeared to him to have no influence. Examining 100 cases, Wegner[6] found the average in patients under 25 to be 23 mm., the average for the whole series being 21 mm. Hg.

(2) The intra-ocular pressure during convergence, was found to be increased in all cases in which a reliable reading could be taken by an amount varying from 2 mm.—10·5 mm. Hg., the mean being 4·9 mm. Hg.

It will be seen by the table that only rather more than half the cases could be examined in this way, as some had left the school before I commenced this part of the investigation, and others seemed unable to concentrate their effort sufficiently to keep steadily gazing at a near object when one eye was covered by the instrument. It was, of course, easy to tell whether or not the necessary convergence was being maintained, not only by watching the eye on which the tonometer was placed, but also by noting the steadiness of the gaze in the fixing eye.

To be able to state definitely that it is the act of convergence which raises the intra-ocular pressure, it is necessary to eliminate the possibility that accommodation may have a similar effect, and to this end one might make similar observations on myopes of some 3·5 dioptres, whose far point is about 12 inches from the eye. Unfortunately, amongst the children I examined, there was not a single myope of approximately this degree, and, although at Hospital I have been on the watch for suitable patients, I have up to the present been unable to find one at a convenient time for examination.

The use of atropine, for the purpose of eliminating accommodation, I found unsatisfactory in the few children I examined, as although it is stated by Lübs,[5] and numerous other observers, that this drug has no effect on the normal intra-ocular pressure, the mydriasis produced prevented good fixation and made trustworthy readings impossible.

However, it is stated in Parson's "Pathology of the Eye,"[7] that several observers working on excised eyes have found no difference in intra-ocular pressure after electrical stimulation of the ciliary region, whilst others, after stimulation of the ciliary ganglion in curarised animals, have obtained the same result. Hess,[8] too, working on monkeys and pigeons, which have a considerable range of accommodation, also obtained the same negative result, while Leonard Hill[9], in his paper on the "Physiology of the Intra-ocular Pressure," very definitely states that "neither the aqueous pressure nor the vitreous pressure change in the least degree during accommodation." It is evident, therefore, that the rise of pressure shown in my cases must be attributed to the convergence alone.

(3) The intra-ocular pressure of eyes under the influence of eserine was found, in 22 out of the 26 cases, to be diminished by an amount varying from 2·25 mm.—7·25 mm. Hg., the mean being 4·6 mm. Hg., while in the remaining 4 cases it was unaltered.

Lübs[5] and others have found that eserine reduces the intra-ocular pressure by an amount varying from 3 mm.—8 mm. Hg., which closely corresponds with the result obtained by me.

At the International Congress of Medicine in 1913, A. J. Ballantyne[2] in an interesting paper on "Observations with a Schiötz tonometer," stated that "it is generally held that eserine has no influence on the tension of the normal eye," while arguing that a suspicious tension reduced by eserine is probably pathological. I think it is evident from these results, which are merely confirmatory of the work of others, that any such general opinion is incorrect, and that this drug does, in the majority of cases, reduce the normal intra-ocular pressure by an amount varying from one-fifth to one-third, which can hardly be called "negligible," although it may not be appreciable to the finger.

(4) The intra-ocular pressure of normal eyes, after the application of a pressure bandage, was naturally found to vary very considerably according to the amount of pressure applied to the eyeball.

I found that an application for an hour and a half was quite as efficacious in reducing the pressure as one continued for six hours; but whereas in Parson's "Pathology of the Eye" it is stated that prolonged application of a pressure bandage may cause the intra-ocular pressure to remain subnormal for a considerable time, I found that it regained its normal level, in the ten cases examined, in from 25—60 minutes. This would certainly suggest that some other factor is present in those cases in which the tension remains low for some time.

The scale readings of a case, in which considerable pressure had been exercised by the bandage, and which can be taken as fairly typical, were as follows, the times being given from the removal of the bandage, the first interval being necessary to allow the cocaine instilled sufficiently to anæsthetise the cornea :—

5 min.	10 min.	15 min.	20 min.	25 min.	1½ hrs.
19	12	10	6·75	3	3

It will be noticed that the intra-ocular pressure, as indicated by the first reading, is extremely low, corresponding (according to the chart accompanying the instrument) to a pressure of 1·5 mm. Hg., but I found that it might be reduced on several occasions to a similar, or even lower level without any harmful effect on the eye, and within twenty minutes of removal of the bandage, the vision had regained its normal acuity. I think this fact should certainly remove any lingering fears that the weight of a tonometer, applied for any length of time to estimate the rate of drainage of the intra-ocular fluids, can possibly be harmful to the eye, and it confirms A. J. Ballantyne's opinion, given in the paper previously mentioned,[2] that any pressure exerted by the instrument is harmless.

I might mention here that, in spite of the fact that my patients were children, and some of the discarded children proved somewhat restless, in no single instance did the use of the tonometer in any way injure the eye; although no special precautions, such as the application of oil, were taken to prevent damage to the corneal epithelium, ordinary care seeming quite sufficient.

Taking the results of these observations into consideration, I think it is evident that they give some support to the advocates of the use of eserine in some cases of corneal ulceration, the diminished intra-ocular pressure lessening the tendency to perforation, and allowing an increased lymph flow through the cornea. Whether these advantages outweigh the disadvantage of a possible attack of iritis supervening with a contracted pupil, is still open to question.

As regards the rise of intra-ocular pressure found to occur during convergence, these results would seem to supply proof, which has been, as far as I can ascertain, previously lacking, for the very general belief that the globe is compressed by the extrinsic muscles during close work, this being an important factor in the production of myopia, especially in children with weak sclerotics. Parsons found that movements of the external muscles raised the intra-ocular pressure, and in his experiments had to curarise the animals with which he was working, but, obviously, could not on them test the effect of convergence.

Lastly, I think it may be worth noting that there seems to be no uniformity amongst workers with the tonometer about the method of fixing the eye, some making the patient gaze at a distant object, others making him fix the the tip of a finger of his own hand while the reading is being taken. I would suggest, in view of these results, that the former method should be universally adopted, in order to make records more uniform.

In conclusion, I must express my thanks to Mr. Treacher Collins for many suggestions made during the investigation upon which this paper is based.

REFERENCES.

1. Smith, Priestley.—[illegible] Review, March, 1915.
2. Ballantyne, A. J.—[illegible]
3. **Elliot, Lieut.-Col.**—*Ophthalmic Review*, November, 1915.
4. Schoenberg.—[illegible] 1913.
5. Lubs.—[illegible] 1912.
6. **Wegner.**—*Arch. f. Augenheilkunde*, Vol. LXVIII, p. 290.
7. Parsons.—[illegible]
8. Hess.—[illegible]
9. Hill, Leonard.—[illegible] 1912.

MEMORANDA.

RETINAL CHANGES IN GLYCOSURIA.*

BY

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THE scope of this communication is limited to a single point ; and the point relates to practice, not to doctrine. In the title I have, with intention, selected the term glycosuria rather than the name diabetes ; and this for two reasons. First, "glycosuria" is a word which has for each of us one and the same perfectly precise meaning, whereas "diabetes," as the name of a disease, is not easy of definition, and any attempt to define it might lead to a discussion wholly outside my present purpose. In the second place, I have, at least here and now, no desire to say whether the case-records which I am about to submit are, or are not, examples of diabetes. I am content to say that they are examples of glycosuria, using this term in its strict and literal sense and neither including nor excluding any more specific classification. My aim is to establish two propositions. These are : (1) that retinal changes—hæmorrhages and retinitis—may be present in glycosuric patients who, but for these changes and for the fact of glycosuria, are wholly free from evidences of organic disease ; and (2) that, as the glycosuria may disappear while the retinal conditions persist, there are stages in the clinical histories of these cases when the ophthalmoscopic facts may be difficult of interpretation.

The clinical experiences on which these statements rest are broadly as follows.—In middle-aged and elderly patients a routine examination of the urine discovers now and again the presence of sugar in small or moderate amount ; this discovery may be termed an unexpected one, inasmuch as the patients do not profess any of the symptoms which are described as characteristic of the clinical course of diabetes mellitus ; in a number of such instances the complaint is solely of chronic digestive disturbances, such as are common experiences in out-patient hospital practice ; less frequently the prominent clinical fact is a muscular paresis, as, for example, an ocular palsy or weakness of the lower limbs ; and occasionally the glycosuria is detected in an examination made in connection with a proposal for life insurance or some kindred purpose, the patient regarding himself as in his normal state of good health. A physician who refuses the name diabetes to a glycosuria which is unaccompanied by thirst or polyuria or loss of flesh, will be obliged to say that these cases are not examples of diabetes. With this doctrinal point, I repeat, I am not at present concerned. My statement is, that in a proportion of the cases above described the ophthalmoscope will discover the presence of hæmorrhages and of white spots or patches in the retina. In other words, retinal hæmorrhages and retinitis may accompany a glycosuria existing as a clinical fact and apart from the recognised symptoms of diabetes mellitus. As particular instances I quote three summarised case-records.

CASE 1.—A woman, *æt.* 55 years, first seen in 1904, when she complained of discomfort after food. No physical evidences of disease, but glycosuria in small amount and numerous dotted hæmorrhages and white spots in each retina ; also some peripheral lens opacities. Patient seen on many occasions during the next eight years and without substantial alteration either in the ophthalmoscopic facts or in her general health. Sugar varied in amount, but was never wholly absent.

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*Communicated to the Ophthalmological Society of the United Kingdom on May 4th, 1916.

Case 2.—A man, *æt.* 46 years, first seen in 1911, when he considered himself to be in good health but desired to be medically examined for certain business reasons. Visual acuity normal, but numerous retinal hæmorrhages and spots of retinitis in each retina; glycosuria to 1 per cent., and clinical examination in other respects normal. Patient continues to lead an active and responsible life, and quite without any sense of ill-health or of disturbed micturition. Glycosuria often absent and retinal changes now less marked than in 1911.

These two records I submit in proof of my first proposition, namely, that retinitis and retinal hæmorrhages may occur with glycosuria of small or moderate amount and unaccompanied by any of the usual symptoms of diabetes mellitus. Incidentally these records show also—and the point is of practical moment—that provided the condition is recognised and the patient treated, the outlook is an encouraging one. They thus contradict the teaching that retinal changes occur with glycosuria only when the glycosuria is part and parcel of a severe and advanced diabetes. I now add a third record.

Case 3.—A woman, *æt.* 46 years, first seen in April, 1915, when she was suffering from flatulence and other symptoms of indigestion. Glycosuria to 4 per cent. and retinal hæmorrhage and retinitis in each eye, but no frequency of micturition or physical evidence of disease save absence of the knee-jerks; sugar absent after four weeks' treatment as an in-patient. Patient seen every two or three weeks during the next nine months, when always without glycosuria, the other facts of the case remaining unchanged.

This record admits more or less the comments offered on Cases 1 and 2. But, in addition, it makes specially prominent the possibility of difficulty in the explanation of retinal hæmorrhages and retinitis should such a patient for any reason be subjected to ophthalmoscopic examination at a date when the urine is free from glucose. It may, I think, be doubted whether in such instances the disappearance of the glycosuria depends solely on a rigorous dietary, seeing that hospital out-patients are notoriously intolerant of dietetic restrictions for which no urgent purpose is apparent to them. In any event the facts remain, and they suggest that just as retinal changes may depend on renal disease, although on more than one occasion there may be no albuminuria, so also such changes may be due to glycosuria, even when on some individual date or dates examination of the urine fails to demonstrate the presence of glucose. There is yet another practical conclusion which follows from these records. It is, that as the patients do not complain either of defective sight or of disturbed micturition, cases of this order are peculiarly liable to be overlooked. Indeed, it would not be unjust to say that if there exists any hospital clinic where routine examination of the fundus oculi and testing of the urine are not systematically pursued, there is a moral certainty that such cases are overlooked. Such experiences, therefore, make an appeal to practice which is too obvious to require definition.

Last of all, I submit that these records are not without the support of a clinical parallel. When retinitis and retinal hæmorrhages are present with glycosuria, it can scarcely be doubted that the glycosuria must have been in existence for a considerable period. Now, if the degenerative changes of a glycosuric peripheral neuritis are much less prone to occur in an acute and severe glycosuria than in a glycosuria of prolonged and chronic duration, it is reasonable to anticipate that degenerative retinal changes will observe a similar history; and the conjunction in Case 3 of glycosuria and retinitis with absence of the knee-jerks is an illustration of the validity of this argument. Both in the one instance and in the other, the explanation doubtless is that such degenerative developments depend less on the degree of prejudice to the blood quality than on the duration of this prejudice. Hence, if a peripheral neuritis may be the first overt clinical manifestation of a secret or concealed glycosuria, it is in the nature of things that retinitis and retinal hæmorrhage should occupy a corresponding position. Actual experience, such is my claim, justifies this presumption, and the finding has an obvious bearing both on the methods which ought to be sytematically pursued in the practice of clinical examination and also on certain practical aspects of diagnosis, prognosis, and treatment.

[In the *Lancet* of September 30th, 1899, I recorded a case of glycosuria in which retinal changes were associated with such evidence of peripheral neuritis as an ocular paralysis, absence of the knee-jerks, and recurrent attacks of sciatica. The retinal changes in this instance were limited to the left eye.]

SEQUEL TO A CASE OF RETINITIS PIGMENTOSA TREATED BY TREPHINING,*

BY

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AT the meeting of the Ophthalmological Society last year (*see* THE OPHTHALMOSCOPE, 1915, p. 477) the author showed a case of retinitis pigmentosa in a girl, aged 17 years, on whom a trephining operation had been performed with the result that in the eye which had been trephined there was great increase in the visual field and loss of the night blindness. This was maintained up to the end of 1915, in that the patient when she covered her unoperated eye, could move about freely in the dark.

Since the beginning of this year, the patient has found that the night blindness is beginning to return, although it is not as bad as in the unoperated eye. At the present time the chart shows that the left field is larger than the right, and the patient still volunteers the statement that she sees considerably better with the left eye than the right and is still desirous to have the latter operated upon. The trephining hole is completely blocked, and the wound in the sclera is not now leaking. As the author suggested at the time, the result obtained by the operation was probably only a temporary one ; although this is not entirely proved by this case, since the trephining hole has become shut off, and he still thinks it may be justifiable in certain cases.

In the aunt of the patient, who was also operated upon in the very advanced stages of the disease, there has been comparatively slight improvement in her condition.

CAPSULOTOMY AFTER CATARACT EXTRACTION.†

BY

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THE various cataract operations and their modifications have been frequently discussed, but, so far as I know, comparatively little has been said about the treatment of secondary cataract or opaque capsule. This is the more surprising when one considers that a cataract operation may have been faultlessly performed, and the healing may have been perfect, and yet the vision may be very bad from subsequent capsular opacity.

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* Case shown at the Ophthalmological Society of the United Kingdom, May 5th, 1916.

† Communicated to the Ophthalmological Society of the United Kingdom on May 6th, 1916.

The treatment of this complication should therefore be regarded as a deferred step in the original operation, and is quite as important as the other.

If the opacity reduces the vision to 6/18 or less, a capsulotomy has to be considered.

Whatever operation is selected, it should be done in a dark room, and the capsule illuminated by a focusing electric lamp held by an assistant. In ordinary daylight, the clearer parts of the capsule may not be visible, and it is often difficult to see what one is doing.

Two instruments are commonly used, a Bowman's needle or a Knapp's knife-needle.

A single Bowman's needle should not be used. The cutting edges of the lance-shaped head are so short that, when the instrument has been pushed through the capsule, the work is done by the pressure of the cylindrical stem. This may cause too great a strain on the zonula. It is much better to use two such needles introduced simultaneously from each side of the cornea, pass the two points through the centre of the capsule, and then separate them by approximating the handles. Each needle takes up the strain produced by the other, and the zonula is spared. Unfortunately, the capsule tears in the direction of least resistance, and an awkwardly placed opening, shorter and narrower than was expected, may be the result.

A Knapp's knife is to be preferred to a Bowman's needle, because it cuts instead of tearing. Two such knives can also be used simultaneously. But even so, cicatricial bands may be pushed aside only to return to their original place when the instruments are withdrawn.

In operating with a Knapp's knife-needle I have observed the following points:—

1. It is possible to make a puncture anywhere in the capsule.

2. If a cut be made in any direction from such a puncture, the capsule gives way at first easily. But as the knife advances, the tendency to cut diminishes and the capsule is merely pushed before it. The cut is sometimes very short, perhaps no more than 1 mm.

3. If it is desired to enlarge an opening to reach a certain point, it is easier to do so by making a fresh puncture at that point, and to cut *to* the opening, rather than by cutting *from* the opening to the point.

4. If two openings have been made on either side of a cicatricial band, the latter will move so easily before the knife that it usually refuses to be cut.

5. A straight cut produces an oval opening, which becomes narrower the denser the capsule. In some cases the result is a slit with the edges touching. A curved cut always makes a wider opening.

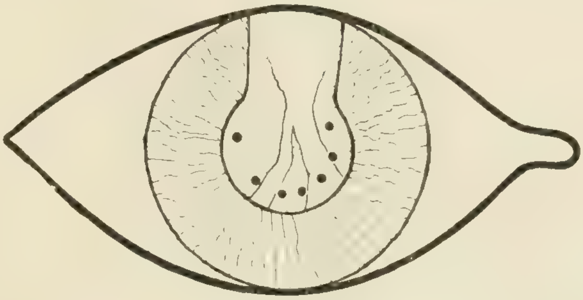
6. The best all round vision is obtained by making an opening the size of the pupil. It is true that when the light is good, a much smaller opening will produce a very clear retinal image. But when the light is bad, the image is too faint.

7. Capsular remains round the opening scatter the light and produce a white fog. This may not be very evident in the conditions of sight-testing, but is often very annoying in a room with cross lights or in the open air.

The last two points may explain why some patients who get a vision of 6/6 "grumble so unreasonably."

For some years I have found the following operation more satisfactory than any I had previously [illegible]

A Knapp's knife with its edge directed upwards is passed through the cornea at a point midway between the centre and the external margin. The point is then pushed through the capsule as near the outer edge of the coloboma as possible and a cut made upwards. The knife is then withdrawn sufficiently, so that another puncture can be made further down. From this another cut is again made upwards to join the first. This manœuvre is repeated all round the margin of the pupil until the inner edge of the coloboma is reached. A semi-circular cut has thus been made, which gapes a little downwards and considerably more upwards. The lower border of this opening should slip under the iris, while the upper edge is either horizontal or concave downwards. No capsule should be seen except in the coloboma, and that is covered by the upper lid. The distance between each puncture may be as much as 3 mm. where the capsule is very thin, and considerably less where it is thick. Where a narrow band exists, a puncture should be made just before reaching it, and another immediately it is passed. A band of 2 mm. or more should be negotiated in two stages. The passage of the point through the capsule may be facilitated in this way.—Make it touch the place which is to be pierced and then push it through with a little jerk. If one attempts to pass it slowly, the capsule may only sink backwards without puncture. When a band does not give way under simple pressure, a slight sawing motion may be added. Each cut should be finished before passing to the next. A band left over to the end will give but not cut.



The stippled parts represent thin capsule and the white parts cicatricial bands. The black dots represent the successive punctures from which the incisions proceed.

The operation can, of course, be modified by avoiding some specially dense part. The essential feature is to make a *curved* incision by means of a series of closely-spaced punctures, cutting backwards from each to the preceding one. The blade of the knife is tangential to the curve one intends to make, and the back of the knife is always pointing in the direction the curve is taking.

In Knapp's knife-needle the width of the blade and the diameter of the stem have been so calculated that the stem exactly fills the opening in the cornea. There is therefore no fear of loss of aqueous when the instrument is moved in its corneal collar. Knapp specified that the blade should be 4·5 mm. long. Some instruments are sold bearing his name in which the blade is 7 mm. This is far too long, and introduces the danger of cross-cutting the cornea when the instrument is partially withdrawn. For my operation a length of 4 mm. is quite sufficient. The sharpness of the point and edge should come up to the standard required in a cataract knife.

SOME SUBJECTIVE PHENOMENA OF VISION AND THEIR EXPLANATION ON THE THEORY OF VISION.*

BY

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THERE has been much discussion as to the explanation of the colours of the Benham top. This consists of a cardboard disc, one-half of which is painted black, while on the other half are drawn four successive groups of curved black lines at different distances from the centre. When the disc rotates rather slowly, each group of black lines generally appears to assume a different colour, the nature of which depends upon the speed of the rotation and the intensity and quality of the light. Under the best conditions the inner and outer groups of lines become bright-red and dark-blue; at the same time the intermediate groups also appear tinted.

It has been frequently stated that at a meeting of the Ophthalmological Society at which this top was discussed, I was called upon for an explanation and did not respond. I was not present at the meeting, and have stated this fact on many occasions, and, on hearing that my theory had been called in question, sent an explanation, which was published in THE OPHTHALMOSCOPE.

The theory under consideration is that a ray of light impinging on the retina liberates the visual purple from the rods and a photograph is formed. The rods are concerned only with the formation and distribution of the visual purple, not with the conveyance of light impulses to the brain. The ends of the cones are stimulated through the photo-chemical decomposition of the visual purple by light (very probably through the electricity which is produced), and a visual impulse is set up, which is conveyed through the optic nerve fibres to the brain.

It will be seen on this theory that the rods have the very important function of regulating the photo-chemical sensitiveness of the liquid surrounding the cones and a number of phenomena will be described which can be explained by variations of this function.

The facts of the Benham top are not only easily explained by the theory, but are a necessary consequence of it. If the visual substance is photo-chemical, then it must obviously behave in a similar manner to other photo-chemical substances. All photo-chemical substances have a different maximum sensibility for different intensities of light. With a feeble light the maximum intensity is nearer the violet end of the spectrum than with a brighter light and the same is found with vision. In a dim light the maximum sensibility is found to the blue-green rays. With a very bright light the maximum sensibility is to the yellow rays. Not only is this true for the whole retina, but it is equally true for parts of it; therefore when the image of a black object falls upon the retina, this portion of the retina becomes more sensitive to the blue-green rays. It follows from this that the after-image of black is really blue-green and not white, and it is quite easy to show that this is the case.

Let the reader take a piece of absolutely black paper or black velvet of about three inches square and having closed one eye and covered it with the hand, place the paper upon a white surface and direct the open eye upon it steadily for about ten seconds and then look away to some portion of the white surface; a brilliant blue-green after-image of the black object will be seen, as brilliant, in fact, as if the black object had been a red one. If a small piece of white paper be placed in the centre of the black, this will be seen as red in the after-image by contrast. The red lines, therefore, of the Benham top are seen as red, through simultaneous contrast to the green which is entirely overlooked. The blue lines are also simultaneous contrast phenomena to the white, which has now become yellow as is the case when the intensity of a light is increased. This fact may be observed by noticing the appearance of white objects in sunlight which actually appear yellow, though the sunlight is pure white light, and the shadows appear blue by contrast. A sunlit scene on the stage is imitated by illuminating the scene with yellow light. The other colours are modifications, which are produced by a fluctuation between an increased sensitiveness to green after the black to an increased sensitiveness to yellow after white. The phenomena can be best demonstrated by means of a rotating cylinder, on which paper which is half black and half white can be attached, with the necessary lines. The fixation point is then definite, and the eye does not wander, as is the case with the top. The most important point, however, is that white paper can be placed by the side of the other, and then it can be clearly shown by comparison that the white seen after the black is green. The cylinder can be rotated at any required speed. Many attempts have heen made to explain the phenomenon on the trichromatic theory, but Bidwell showed that no explanation on this theory is tenable. A greenish-yellow spectral light may be exactly matched by a mixture of red and green spectral lights. If the trichromatic theory were true, and the yellows physiologically identical, then the red lines should be visible when the top is illuminated by the simple or mixed lights, but it is found that whilst the red lines are plainly visible when the top is illuminated with the mixed lights, no red is to be seen when the top is illuminated with the pure greenish-yellow. On any form of the trichromatic theory, pure greenish-yellow light is supposed to stimulate the red sensation strongly. The red and blue lines are only seen in conditions favourable to simultaneous contrast. The red lines are not seen when the top is viewed through a blue-green glass, nor the blue lines when it is observed through a red glass.

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* A Demonstration to be given at the Oxford Ophthalmological Congress, July, 1916.

The rods only appear to pour out the visual purple as it is required, and during sleep it would seem as if it were not liberated at all. I have had the very unpleasant experience, which has also been that of others, of waking up in the night and finding myself blind for a few seconds. Many have observed that the fovea is blind on awaking in the morning. If, on awaking, one eye being closed and covered with the hand, the other being directed to a white ceiling, the foveal region appears as a black spot, and light appears to invade it from without, inwards. If this eye be also closed and covered with the hand, purple circles will form round the centre of the field of vision, and, gradually contracting, reach the centre. When the circle reaches the centre it breaks up into a star-shaped figure and becomes much brighter. It then disappears, and is followed by another contracting circle. Now it will be noticed that if the eye be opened when the circle has broken up, a brilliant rose-coloured star, much brighter than any other part, will be seen in the centre of the field of vision. If we wait until the star has disappeared before opening an eye, the macular region appears as a black spot as before. This conclusively shows that the central portion of the retina is sensitised from the peripheral positions. Now it will be noticed that movement of the eye has an effect upon the photo-chemical material. For instance, if the eye be moved when the star-figure is seen, this will change its shape, and be greatly elongated. It is probable that this is an important factor in vision, and by this means the photograph is washed out when the eye is moved and the sensitive material re-distributed ready for another photograph.

It will be noticed that the purple circles do not follow each other in any regular order as far as time is concerned, at one time they follow at fairly frequent intervals, at another when the retina is darkened at very prolonged intervals. It would appear therefore that the rods have the special function of regulating the amount of visual purple poured out in accordance with the requirements of vision.

It is obvious that the retina is in a very different condition when a man has been for an hour in a dark cellar, from what it is in a brightly lighted room. Much less photo-chemical material will be used up in the dark cellar, and though less might be poured out, it would tend to accumulate and the retina become more sensitive. It would be expected that each set of rods would control the distribution in its particular region of the retina and that we ought to be able to elicit some important phenomena by alternately lightening and darkening some portion of the retina. This is the case, and the phenomena can be well shown by means of the rotating cylinder already mentioned. One eye being closed and covered with the hand the other is directed fixedly at the rotating cylinder. Various phenomena will be seen ; the centre may appear as a black spot and purple circles appear in the middle and periphery. These move towards the centre, and on touching it change it from a black spot to a bright one. It will be noticed at one time that the foveal region has the exact appearance of the cone distribution of this part of the retina. It will be seen that the centre of the field of vision appears to be in violent movement of a similar character to a whirlpool. It will be noticed that the currents which pass across the field of vision change their shape as well as their position in the field of vision ; this is particularly easily seen when the cylinder is viewed through a yellow glass.

It is obvious that these currents can only correspond to currents in the retina. They cannot be circulatory phenomena, because they change their shape and position in the field of vision. It is easy to comprehend how these currents, with their varying amount of photo-chemical material, should cause the subjective projection of the cones, but they are quite incomprehensible on the older theories of vision. The theory given, however, explains this and numerous other phenomena which have been lost sight of because of their inexplicable nature.

The account of this demonstration has been given in advance, so that the reader can test any point for himself. In testing any subjective phenomena it is advisable to select a good observer and to ask him or her to observe the phenomenon, but without stating the nature of the fact to be observed. For instance, an observer who is so prejudiced that he cannot see the after-image of black as green will have his opinion shaken on asking two or three other persons to describe the colour of the after-image seen after viewing a piece of black velvet for a few seconds and then looking at a white surface, and receiving the reply, "Why, bright blue-green, of course."

The entoptic appearance of the visual purple would appear to be due to the fact that light, both reflected and transmitted, has to pass through the layer of photo-chemical liquid before reaching that immediately surrounding the cones, the usual balance being upset by the alternation of black and white. The layer of liquid, therefore, acts as a coloured screen which absorbing a certain amount of light makes the image appear rose-coloured.

A CASE OF RUPTURE OF THE EYEBALL FOLLOWED BY DISAPPEARANCE OF THE IRIS.*

BY

SYDNEY STEPHENSON,

LONDON, ENGLAND.

History.—Mabel K——, aged 40 years, was admitted as an in-patient to the King Edward Memorial Hospital at Ealing on November 28th, 1915.

At 6.30 p.m. two days before (November 26th), she had stumbled over a basket, and struck her left eye with violence against the corner of a wooden pedestal cupboard. As an immediate result of the accident, the eye was flattened and sight was lost. Dr. Thomas Fleming was consulted less than an hour after the injury. That gentleman informs me that the eyeball was ruptured, the anterior chamber was full of blood, and that there was an extensive subconjunctival hæmorrhage. There was also a small black patch which he took to be a prolapse of the iris.

Condition on Admission.—When admitted, there was a good deal of bruising around the eye and a couple of small wounds in the upper eyelid. The left eye had been ruptured in the ciliary region, a few millimetres below and to the outer side of the cornea, and the wound included a little black tissue level with the surface of the sclera. The anterior chamber contained a considerable amount of blood. Sight=fingers near face. Tension normal. No particular pain.

Treatment and Progress.—The case was treated by atropine to the eye, an occlusion bandage, and rest in bed.

The patient was discharged from the Hospital on December 10th, 1915.

Seen on December 14th, the left eye was found to have perception of light. Tension+1. Some complaints of pain. Most of the blood had been absorbed from the anterior chamber, which was very deep. No iris could be seen. Large floating clots were present in the vitreous, but no details of the fundus could be made out.

January 4th, 1916.—L.V.=6/60. T.n.

On April 4th, 1916—that is, upwards of four months after the accident—the condition of the injured eye was as follows: anterior chamber deep. No trace of iris to be seen. Lens, which showed peripheral opacities, subluxated slightly upwards and inwards. Floating bodies in vitreous not now very numerous. No changes in the fundus. V.=6/36 1 letter, and No. 16 J. Some irritability, so that patient prefers to sit with her back to light, and covers eye when out of doors. Intermittent pain.

Remarks.

An accident such as the foregoing cannot be of common occurrence. It is, at all events, the first I have personally met with in the course of a good many years' experience. Disappearance of the iris can scarcely in this case be ascribed to avulsion of the iris from its ciliary insertion, inasmuch as there is no history of the escape of any such tissue from the eye immediately after the injury, neither can any trace be now found of the iris lying free in the anterior chamber. Could so-called "inversion" (Ammon) account for the apparent aniridia? The lens, as stated, is subluxated upwards and inwards, so that there is bound to be a deficiency, not to say a hiatus, in the lower-outer part of the fibres of the suspensory ligament. The conditions for a partial inversion of the iris, therefore, are present, but that would scarcely account for the appearances in the present case. Since the absence of iris was observed within a few days of the injury, as soon as the blood effused from the presumably ruptured anterior ciliary vessels had been absorbed from the anterior chamber, it is unlikely that the condition described by Stephen Mayou (*Trans. Ophthal. Society U.K.*, Vol. XXIX, p. 254, 1909) as sometimes responsible for disappearance of the iris, namely, the organisation of fibrous tissue on the anterior surface of the iris, was present.

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* Case shown at the Ophthalmological Society of the United Kingdom, May 5th, 1916.

All things considered, the appearance is probably to be explained by rupture of the ligamentum pectinatum, so that the ciliary body, carrying with it the iris, has slipped backwards on the sclera.

The attention of the profession was first called to this class of injury by E. Treacher Collins (*Trans. Ophthal. Society U.K.*, Vol. XII, p. 180, 1892), and cases have been reported by Leslie Buchanan (*Trans. Ophthal. Society U.K.*, Vol. XXVIII, p. 253, 1903) and others.

CURRENT LITERATURE.

NOTE. Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—ANAPHYLAXIS.

v. Szily, A.—Researches and views concerning the role of anaphylaxis in inflammations of the eye. Versuche und Gedanken uber die Rolle der Anaphylaxie bei Augenentzündungen. *Klin. Monatsbl. f. Augenheilkunde*, January, 1915.

v. Szily, of Freiburg i. B., who is a recognized authority on the subject of anaphylaxis, presents in this communication a critical discussion of his own and other recent researches bearing on the part played by anaphylaxis in the inflammations of the eye.

The following are some of his conclusions.—1. The local anaphylactic inflammations of the eye, produced experimentally, have a great practical and theoretical significance for human pathology, but it is too early to attempt to explain specific diseased processes in the eye on the basis of a more or less clear resemblance to experimentally induced conditions. 2. In the course of different eye diseases the conditions are favourable for the development of anaphylactic toxins. The sources of such substances may be certain components of bacterial toxins, or products of the tissues of the affected animal. 3. We cannot speak of anaphylaxis as the prime cause of any specific eye disease. 4. There is no proof that damage to one eye, *e.g.*, by tubercle, renders the other eye more sensitive to the same agent. 5. The value of anaphylaxis for ophthalmology is that it seems to offer the possibility of explaining eye inflammations which cannot be satisfactorily accounted for by the immediate local action of bacteria or their products.

A. J. BALLANTYNE.

II.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(Third Notice.)

(1) **Moore, R. Foster.—The incidence of renal retinitis in soldiers suffering from epidemic nephritis.** *Lancet*, December 18th, 1915.

(2) **West, Samuel.—Albuminuric retinitis in epidemic (acute) nephritis.** *Lancet*, February 12th, 1916.

(3) **Moore, R. Foster.—Albuminuric retinitis in epidemic (acute) nephritis.** *Ibidem*, March 4th, 1916.

(4) **Campbell, Kenneth.—Albuminuric retinitis.** *Ibidem*, March 11th, 1916.

(5) **West, Samuel.—Albuminuric retinitis.** *Ibidem*, March 25th, 1916.

(6) **Chatterton, Edgar.—Albuminuric neuro-retinitis** *Ibidem*, April 1st, 1916

(7) **Peter, Luther C.—Eye phenomena observed in three hundred and twenty cases of pulmonary tuberculosis.** *American Journal of Ophthalmology*, April, 1916.

(8) **Widal, F.—On ocular symptoms in nephritis.** *Medical Press and Circular*, May 10th, 1916.

(1) The principal points in the interesting article by **Foster Moore,** of London, are as follow :—(1) of 119 soldiers from France suffering from epidemic nephritis, 5 were either the subjects of renal retinitis or the latter developed under observation. In addition, 7 presented very small retinal hæmorrhages, very few in number, and not considered to be of any particular significance. (2) The average systolic blood pressure in 70 men with normal fundi was 143 mm., whereas that of the 5 men with retinitis was 180 mm. (3) In the case of the 5 men who developed retinitis, the intervals between the onset of symptoms of nephritis and the development of retinitis were approximately, 7, 8, 8, 13, and 9 weeks. (4) The retinitis which developed did not differ in appearance in any essential from the retinitis of chronic nephritis. In each of the men in whom it occurred the general symptoms were severe, and, in general, the more severe these symptoms, the more extensive were the changes in the retina. Retinal detachment occurred in 3 of the cases. (5) There is no doubt that the very great majority of the 119 men were suffering from a primary acute nephritis and were not the subjects of a previously existing chronic nephritis. In the case of the 5 men with retinitis a special effort was made to ascertain any evidence which might point to a previous nephritis. This was obtained only in 1 case (the author's statement about this case does not seem to the reviewer to be perfectly clear), in the other 4 there was no discoverable reason to suppose a previous nephritis. (6) It would thus appear at first sight that retinitis may occur in primary acute nephritis. But the author's previous experience is against this view, and he analyses the cases with a bias in favour of bringing them into a chronic category. His words are :—" If now the present cases are considered with regard to this point, it will be seen that a very large majority have run the course of an acute nephritis, ending in temporary recovery without the development of retinitis. On the other hand, the course of the disease in some cases has been more progressive, and instead of improvement towards recovery occurring, the œdema and urinary signs have persisted. the blood pressure has

increased, and uræmic symptoms have appeared. The acute disease has merged gradually into a condition of chronic nephritis, and it is in this group of cases that retinitis has occurred. It should be stated that some cases have run a more mild chronic course without developing retinitis; thus 2 men have been watched for 20 and 21 weeks respectively, and although symptoms persist the fundi are normal. It would seem then that strength is lent to the view that retinitis does not occur in primary acute nephritis, but that when this gradually and directly merges into a condition of chronic nephritis, retinitis may coincidentally develop. In this latter case the signs of retinitis may be seen as early as within 7 weeks (Case 1) or 9 weeks (Case 5) of the onset of symptoms of the acute disease."

For the sake of making a clear abstract of the author's views, the reviewer has avoided a number of details. The article ought to be read in the original to appreciate the actual retinal changes in each case.

(2) **West**, of London, writes at some length in the correspondence columns of the *Lancet* regarding epidemic nephritis, and more particularly with reference to the recent paper by Foster Moore (*Vide supra*, No. 1). West says that Foster Moore's article is a valuable one, but that it would have been still more so if its author had carefully defined what he meant by chronic nephritis and by renal retinitis. The term chronic nephritis is often used to cover both kinds of chronic nephritis and confuses two conditions which are essentially distinct, namely, parenchymatous nephritis of some duration, and granular kidney. Albuminuric retinitis also exists in two forms, which should be sharply distinguished from one another. These have been named by West the exudative and degenerative forms. They are quite distinct from one another in their ophthalmoscopic appearances, and in their pathology, as well as in their clinical significance. The exudative form is the same as that usually understood by the term acute optic neuritis, and is like that seen with a cerebral tumour. It may occur with acute or chronic parenchymatous nephritis, and may then resolve or disappear if the nephritis recover. It may also occur in granular kidney in the terminal stage when the end is near. The degenerative form presents the glistening white patches which are so characteristic of albuminuric retinitis. It is pathognomonic of granular kidney. It may in the later stages of granular kidney have grafted on it, or have added to it, the exudative form, but the two forms are even then independent of one another. The statements made about albuminuric retinitis in books are hopelessly contradictory; and this is not surprising, for with two forms of chronic nephritis distinct from one another, and two forms of albuminuric retinitis, also distinct from one another, there is plenty of room for divergence or contradiction if the distinctions are not made and not clearly observed The two terms which lead to all this confusion are chronic nephritis and albuminuric retinitis. If these are properly defined and the distinctions strictly observed, all the apparent contradictions can be reconciled. Regarding Foster Moore's observations it is clear, says West (1) that all the cases he deals with are acute nephritis. Even what he calls chronic nephritis is merely acute nephritis which has lasted somewhat longer than the others; and the pathological condition is that of chronic parenchymatous nephritis or the large white kidney. (2) That the form of albuminuric retinitis met with in his cases is of the exudative type. Thus defined Foster Moore's paper has a greater value than he claims for it. It shows, first, that albuminuric retinitis in one of its forms occurs in acute nephritis, on which he expressed a somewhat uncertain opinion. There can be no doubt of the fact. West has seen many instances of it himself. West

concludes as follows : "(1) Albuminuric retinitis may occur and is not rare in acute nephritis. (2) It is of the exudative type. (3) It is an indication of the severity of the case, and although more likely to be found in cases of some duration, it may be present quite early if the case be severe or remain absent thoughout if the case be mild. (4) In any case, if the nephritis resolve it may completely disappear and leave no defect of vision behind. (5) The statement that it is toxic in origin is probably correct. Foster Moore's observations are a distinct contribution to the subject, and so far as acute nephritis is concerned, confirm the views I expressed definitely in my Lettsomian lectures of 1900."

(3) In a letter to the Editor of the *Lancet* **Foster Moore,** of London, replies to the letter of Samuel West abstracted above. Moore points out that while he was not able in an article of the nature of the one referred to, to define and delimit exactly what are meant by chronic nephritis and renal retinitis, so also West does not define what he means by a granular kidney. Further, Moore says, regarding West's letter, " I cannot follow him (West) when he says that the 'exudative' form 'is the same as that usually understood by the term acute optic neuritis, and is like that seen with a cerebral tumour." " In rare instances," says Moore, " renal retinitis in its early stage takes the form of 'optic neuritis', which may be indistinguishable from that seen with a cerebral tumour; this, however, is quite unusual, and with the progress of the disease the development of isolated soft-edged areas of exudate, wide of the disc, usually renders obvious the nature of the change. Nor can I agree entirely with his description of the 'degenerative' form ; for whilst the appearances are highly characteristic, they are not entirely pathognomonic of granular kidney, and although the small white spots which compose the star figure are certainly very chronic in duration, I have watched them by means of outline plans from month to month, and in four cases at least have found them to disappear and leave no trace behind."

(4) In the *Lancet* of the following week **Kenneth Campbell,** of London, takes up the same point as that last referred to by Foster Moore in the quotation above given, that, namely, regarding the degenerative form of retinitis. He says that West's statement is quite at variance with the experience of ophthalmic surgeons. Precisely the same fundus picture is sometimes found in diabetes, the albuminuria of pregnancy, scarlatinal nephritis of children, and in intracranial tumours.

(5) **West,** of London, replies to the reply of Foster Moore, of which latter an abstract will be found above. Dealing with the exudative form of renal retinitis and its resemblance to that seen in cerebral tumour, West says that he did not intend to imply that it is similar to the optic neuritis commonly seen with cerebral tumour, but to that seen occasionally in cerebral tumour, where the exudation " forms more or less extensive areas with soft edges and of a yellowish-white colour, widely and irregularly dispersed over the fundus." Regarding the degenerative form, Moore states that this is highly characteristic, although not pathognomonic. West says that, in his experience, it is pathognomonic of granular kidney. In reply to Moore's accusation that he (West) had not " defined " granular kidney, West had hardly thought it necessary. His object was to make distinctions not definitions. West concludes, " My own conclusions are based upon long clinical observation and I state them as such. I cannot doubt that the experience of others who approach the subject with an open mind will tally with my own." Such a statement is hardly likely to end the argument !

(6) Referring to the correspondence which has recently been going on in the columns of the *Lancet*, and of which abstracts in this number of

THE OPHTHALMOSCOPE, **Chatterton**, of London, traverses the opinions expressed by West in the following terms :—"Eighteen years' clinical and pathological experience at ophthalmic hospitals, so far from affording material confirmatory of his views, directly contravenes them. Dr. West's types, if such they can be called, are found also in acute nephritis and in the nephritis of pregnancy. The latter, it is to be observed, has as its most prominent feature a fatty degeneration of the tubal epithelium, and is not really an acute inflammation. So far from any particular appearance of the retina being pathognomonic of a particular variety of kidney disease, no absolute reliance can be placed upon retinal appearances as a distinctive character. In diabetes, for instance, a condition exactly resembling the 'typical' albuminuric variety of retinitis is so often found that the examination of the urine alone will reveal the causal agency. . . . . The same is true of leucocythemia, pernicious anæmia, and arterial sclerosis and cerebral tumour. . . . . Since albuminuric neuro-retinitis is essentially a degenerative process, nothing is gained by labelling it 'degenerative'; to do so is pleonastic. Both of the types which Dr. West regards as distinctive, and of fundamental importance from the diagnostic standpoint, are due to the same cause: passive œdema and vascular degeneration. Neither type can be said to be either distinctive or pathognomonic." ERNEST THOMSON.

(7) **Peter,** of Philadelphia, has examined the eyes of 320 patients, whose ages mostly ranged from 20 and 30 years, inmates of the Rush Hospital for Consumption and Allied Diseases, the majority of whom were in the last stage of pulmonary tuberculosis. The conditions he found are divided into two classes:—(1) Those which may be directly traceable to tuberculosis, and (2) those which occur coincidentally with, but are not due to, the tuberculous process. The latter we need not discuss. As to the former, the most noteworthy finding was engorgement of the retinal veins, present in 314 of the 320 cases of tuberculosis. The lower branches of the veins were usually found to be engorged more than the upper branches. In some instances the veins were decidedly tortuous, the disc was blurred, and retinal haze was well marked in seventeen cases. In thirty-four cases the condition was that of a low grade neuro-retinitis, and in one instance there was papillœdema of about 4D. Peter regards a mechanical stasis as the immediate cause of this phenomenon, aided by malnutrition, cardiac weakness, and toxæmia. The clinical picture is not so characteristic as to be of diagnostic value, since the same condition may be observed in other patients whose vitality has been reduced by months or years of suffering and disease. There is, however, some relation to the stage of the disease. The symptom is most marked in those who suffer from repeated hæmorrhage or are approaching dissolution. It can hardly be regarded as of much value, for the patients' general condition is apparent even to a casual observer.

In no single case was tuberculosis found in the uveal tract of Luther's patients. Phlyctenular cicatrices of the cornea were noted in three children. An unusually wide palpebral fissure and v. Graefe's sign (S. S. Cohen) were found in many cases, and are regarded by Peter simply as so many signs of emaciation caused by prolonged illness. SYDNEY STEPHENSON.

(8) **F. Widal,** of Paris, points out that it is a comparatively short time since we learned to connect certain disturbances of the eye with constitutional disease, and claims that to the French school belongs the credit of having elucidated the bearings of nephritis upon the retinal semiology. Such cases are now classified into three groups:—(1) The hypertensive; (2) the chloroidæmic; (3) the azoturic.

In the patient, whose case forms the text of Widal's lecture, the prominent complaint was of visual disturbances, found to be due to hæmorrhagic neuro-retinitis. There was a suspicion of white retinal patches. Blood-pressure high. Urine included 2.25 gm. of albumen per litre, with a few granular casts. There was no œdema. Each litre of blood serum contained 0.56 cm. of urea. Apart from this, the clinical evidence of azotæmia was wholly unconvincing. It seemed as though the hypertensive form of nephritis was present in this woman, whose age was seventy years.

Upon the results of the ophthalmoscopic examination depend, however, both the diagnosis and the prognosis of a nephritis. The hypertensive variety is shown by retinal hæmorrhages, and chloroidæmia by œdema of the papilla. The existence of azotæmia is indicated by the finding of the white patches of retinitis. In that event, even should there be not more than 0.57 cm. of urea per litre of blood serum, we are in a position to assert that the patient is azotæmic, and, further, that the azotæmia is likely to prove progressive. This relationship between azotæmia, on the one hand, and retinitis, on the other, obtained even in incipient cases. Retinitis is the sign which betrays the the advent of progressive azotæmia at a stage when it may practically be impossible to obtain any chemical evidence of its existence.

The ocular examination of Widal's patient, then, confirming as it did, the chemical examination, enabled him to say definitely that it was an instance of commencing and progressive azotæmia. SYDNEY STEPHENSON.

III.—CAUSES OF FAILURE IN THE TREATMENT OF SQUINT.

Bielschowsky, A.—Uncommon causes of failure in the treatment of squint. (Ungewöhnliche Ursachen von Misserfolgen in der Therapie des Schielens.) *Archiv für Augenheilkunde*, May, 1911.

Bielschowsky, of Leipzig, groups the results of squint operations under three heads : complete success, partial success, and failure.

A complete success can only be claimed when permanent binocular vision has been attained. This desirable result is a rare event, and cannot be expected in the presence of marked amblyopia or defective fusion faculty.

Generally, we must be satisfied with a partial success, a cosmetic improvement.

A failure must be recorded if the squint has not been corrected, or if, although the deformity has been remedied, other subjective disorders have developed.

The surgeon must be held responsible if the lack of success is caused by lack of proper appreciation of the conditions of the anomaly or by defective operative *technique*.

Operative measures must be undertaken only when a change in the mechanical factors forms the sole means of curing the squint. In operating we must do all we can to preserve unimpeded motility of the eyes.

The commonest error is made in the case of hyperopic children with convergent strabismus. The hyperopia is not detected or is insufficiently corrected, or the full correction is not persevered with long enough to cure the squint. In other cases the relatives wish to have squint cured without the use of spectacles. If the strabismus be caused merely by excessive accommodation, the alteration of the previously normal position of anatomical equilibrium must sooner or later lead to divergence. A similar failure will follow a premature operation upon a paralytic squint. It is incorrect to operate in cases of pure insufficience of convergence when there is relative divergence for near vision but no absolute divergence which can be detected in distant vision. We have here a pure defect of innervation ; therefore an alteration of the mechanical relationships can only afford binocular vision for a certain middle distance at the cost of the original correct adjustment for sight.

A failure will result if tenotomy be performed when the nature of the defect indicates advancement of the agonist. This error of judgment yields numerous disasters. If, for example, in a case of paresis or post-operative insufficience of a muscle, the agonist be tenotomised, the most we can hope for is correction of the squint in the primary position, but we have now instead of one muscle of defective power, two. Binocular vision is possible only in one direction ; in all others diplopia obtains, and the sense of orientation is seriously damaged.

Simple tenotomy, the mere separation of a muscle from its insertion, is always a rough and, therefore, a dangerous procedure, and in cases where advancement of the agonist is not absolutely indicated, should be performed in such a way that the effect can be graduated. A suture must be passed through the divided tendon, to exercise a certain influence upon the degree of the effect, and to secure motility in the sphere of action of the muscle in question. Occasionally, failure of correctly performed operations is due to the presence of mechanical hindrances dependent upon anatomical anomalies which cannot be detected by the previous investigation of the case.

Far more frequently, anomalies in the nervous part of the oculo-motor apparatus prevent a successful result in the treatment of a squint. The most important of these is the so-called absence of the fusion sense. Lack of fusion power may depend upon a congenital or early acquired defect in the brain, and it then forms, on the one hand, the chief cause of the deformity, and, on the other, the all-potent influence which hinders complete cure. The best we can do is to remedy the visible defect. If, then, the images in the squinting eye remain below the threshold of perception, so much the better for doctor and patient. But the cosmetic improvement is all too often bought at the expense of a post-operative diplopia, which is apt to be very stubborn, and which may even impel the patient to ask to have his squint re-established. In most cases when a tendency to suppression of the image from the squinting eye exists, careful orthoptic treatment will remedy the trouble ; in fact, it generally disappears spontaneously in a few days. In some cases, unfortunately, we may seek in vain to fuse the double images.

The cases in which lack of fusion sense causes an actual organic change are difficult to differentiate from those in which there is a functional defect of the apparatus. Functional defects are difficult to diagnose in the presence of a permanent squint. In some of these cases binocular vision is easily and rapidly attained after operation ; in others it can never be obtained.

Functional defects of the fusion apparatus are generally associated with slight or latent squints. Such cases often suffer from neurasthenia and hysteria. Prism exercises and orthoptic training generally fail, and operative measures are even more disappointing.

The author, finally, warns his readers not to be in a hurry to operate and never to do so after one examination only. The smaller the angle of deviation, and the greater the disproportion between the deviation and the subjective symptoms, the longer should one postpone an operation. In such cases if operation becomes necessary, the patient should be warned of the possibility of diplopia.

The paper, unfortunately, contains nothing relating to the causes of failure of the operation to rectify the deformity; operative *technique* is not discussed.

T. HARRISON BUTLER.

IV.—THE VISUAL FIELD IN GLAUCOMA.

Loehlein, W.—Examination of the visual field of glaucoma and its value for differential diagnosis. *Archives of Ophthalmology*, Vol. XLV, No. 1, January, 1916 (translated from the *Archiv für Augenheilkunde*, Vol. LXXVI, Nos. 3 and 4, 1914).

This article by **Loehlein**, of Greifswald, will serve, if possible, to enhance the reputation that writer has already made in connection with his study of glaucoma.

It is virtually a protest against the view that glaucoma should be diagnosed by *any one* sign or symptom, no matter how significant that individual indication may be. In maintaining this most necessary position, he attacks the conclusions drawn by some admirers of Bjerrum and Ronne; but, be it carefully observed, he gives full credit to both those writers for the important work they have done in adding precision to the diagnosis of the disease. Bjerrum believed that arcuate scotomas, always starting from the blind spot, depended upon the functional destruction of certain bundles of nerve fibres, which pass from the upper or lower margins of the papilla, and describe an arc about the macula in so doing; the edges of the excavation seemed to be the most likely site at which the lesion took place. It has never been conclusively shown why two bundles of nerve fibres, so far apart on the disc, should be more early affected than any others. Ronne thought that if the lesion were really due to a defect in the nerve bundles, as suggested by Bjerrum, it should be possible to obtain confirmatory evidence of this by studying the nasal horizontal meridian of the visual field. It seemed probable to him that the horizontal limiting line which runs in the temporal half of the retina, and there separates the fibres which pass respectively above and below the macula, must show the separation between a healthy and a damaged nerve bundle. The expected result would be that the limit of the visual defect would run along the horizontal line separating the upper from the lower half of the visual field on the nasal side. Ronne's work confirmed this supposition, and "the nasal step" is now generally accepted as being a frequent and peculiar defect in glaucoma, and as representing graphically the functional destruction of certain bundles of nerve fibres.

C. H. Sattler found that the Bjerrum scotoma was nearly uniformly present in cases of primary glaucoma, and that Ronne's sign was present in nine out of twenty-six cases, and he was inclined to ascribe a pathognomonic significance to these appearances when they were found to be present. Fleischer went further and thought it was possible to make an early differential diagnosis, by means of these observations of the field, when ophthalmoscopic and other signs still lagged behind. It is this spirit of over-confidence that Loehlein attacks. He warmly agrees with Bjerrum and Ronne that in a high percentage of cases of primary glaucoma, the arcuate scotoma, or the nasal step, or both, are present; but he does not believe that they have the value in absolute diagnostic significance which admirers of the discoverers have maintained.

His first contention is that there are cases of glaucoma in which the visual-field symptoms of Bjerrum and Ronne are both absent. He says "some authors (Priestley Smith and Fleischer) state that the absence of these symptoms excludes glaucoma, and *this I want particularly to contradict.*" He bases this contradiction, however, on one case alone, and this case is open to discussion, for although he insists that it was undoubtedly one of chronic glaucoma, yet it was an instance of the juvenile form of the disease, and, moreover, the discs were not cupped. "The vision, the ophthalmoscopic findings, and the visual field had remained normal." The expansibility of the young eye is well known, and possibly accounts for the fact that nerves and retinæ of this patient had up to date escaped damage. If there is no more convincing evidence forthcoming, it would appear that Priestley Smith's dictum still stands.

His next point is, that we meet in non-glaucomatous cases with visual fields showing Bjerrum's and Ronne's signs. He cites (i) a lesion of the para-macular bundle, following a fracture of the base; (ii) a case of partial atrophy of the optic nerve; with regard to this case, although Ronne's sign was present, the chart published shows that Bjerrum's sign was not, inasmuch as the blind spot scotoma, although enlarged, lay wholly within an area of normal field, and at no point communicated with the surrounding area of absolute loss of field; (iii) a patient with bilateral choked disc; (iv) and ordinary cases of atrophy of the optic nerve. The relatively frequent occurrence of the nasal step in tabetic atrophy, is said by Loehlein to explain the sector-like defects commonly found in such fields.

Whether we agree or not with everything Loehlein has stated in this paper, we owe him a debt for emphasizing the lesson, which cannot be too often repeated, that the sound diagnostician refuses to allow himself to be drawn into a positive opinion as to whether a case is glaucomatous or otherwise, until he has all the available evidence before him. It is true that in this paper his attitude is negative rather than affirmative; he inveighs against premature diagnosis on a partial examination, rather than insists on the fullest possible use of available means, but it is obvious that the larger issue is at the back of his mind the whole time.

R. H. ELLIOT.

V.—EYE MAGNETS AND THEIR USE.

(1) Constentin.—New arrangement for the adaptation of the alternating current to the electro-magnet. Nouveau dispositif pour l'adaptation du courant alternatif à l'electro-aimant. *Archives d'Ophtalmologie*, Janvier, 1915.

(2) Lancaster, Walter B. Stronger eye magnets. *Transactions American Ophthalmological Society*, Vol. XIV, Part 1, 1915, p. 168.

(3) Haab, O. On the correct use of the giant magnet in operations on the eye. *Archives of Ophthalmology*, May, 1916.

(1) Most of the electro-magnets used in ophthalmic work are constructed for the continuous current, necessitating the addition of a costly transformer to

adapt them for use with the alternating current, the usual town supply. For cheapness and simplicity **Constentin** has devised the following apparatus—which he finds efficient :—A glass receptacle containing a solution of phosphate of ammonium, into which dip two electrodes of aluminium and lead respectively, is placed " in derivation " with the magnet. At the moment that the current passes in one direction through the electrolyte, oxygen is given off at the anode and combining with the aluminium forms an oxide (Al_2 O_3) which acts as a condenser. The stored-up energy is given off at the next momentary alternation of the current, and reinforces it in the same direction. For a current of 10 ampères with 200 volts, a 5-litre jar with aluminium and lead surfaces of 7 to 8 square decimetres is necessary. BERNARD CRIDLAND.

(2) **Lancaster**, of Boston, Mass., has devised a magnet tester for the purpose of trying our magnets from time to time, in order to see whether they are maintaining their efficiency. Trials conducted with this device at several large clinics in different American cities have convinced him that the average eye magnet is not half as strong as it might be. We cannot do better than recapitulate the contents of his somewhat technical communication in his own words, as follows :—

" The strength of pull depends not on the intensity of the magnetic field, but on the difference in intensity between neighbouring portions of the field.

Direction of pull is not necessarily along the lines of force, but toward a stronger part of the field by the shortest path.

Limit of strength of pull is not the saturation point so often referred to by writers on eye magnets. The intensity of pull continues to increase as long as the magnetizing force (ampère turns) increases, although at slower and slower rate.

Cores should not be short and thick, but 10 to 15 times as long as they are thick. They should be cylindric, not tapering, and project very little beyond the coil before the tapering pole piece begins.

Coil should be wound over the whole length of the core, not with a vacant gap in the middle. It should consist of much fewer layers than is common, and be of fairly large wire, so as to carry a large current.

The risk of overheating is greatly exaggerated. It is far outweighed by the advantages of using strong currents. Overheating can be avoided by short-time exposure and safe-guarded by enamelled wire.

Foot-switch is indispensable.

The pole should taper in the form of a pointed arch, and be obtuse for action at a distance, sharp at the end for power in contact.

Rheostat is necessary for small but not for giant magnets." G. E.

(3) This article by **Haab,** of Zurich (ably translated from *Archiv für Augenheilkunde*, Vol. LXXVII, No. 4, 1914), is particularly valuable, inasmuch as it embodies the experiences gained by twenty-two years' use of the giant magnet in the extraction of foreign bodies from the eye. It should be studied in the original.

Haab insists upon the fundamental differences between the action of the large and small magnet. Prior to the introduction of the small magnet by McKeown, most eyes injured by the penetration of a foreign body were enucleated as speedily as possible. The small magnet altered all this, for it was found to be a vastly better instrument for grasping a foreign particle than, and much superior to, a pair of surgical forceps. It seized the spicule as soon as it came into close or actual contact with it. On the other hand, the large magnet attracts in proportion to its size. The lines of force exerted by the giant magnet proceed from the tip of the magnetic pole, with considerable divergence or diffusion. When the pole is placed at the centre of the cornea, the foreign body is drawn forward, most advantageously towards the middle of the lens. When it has reached the posterior surface of the lens, following the line of least resistance, it passes along the smooth surface of the capsule to the lens equator and comes into contact with the posterior surface of the iris, since the zonular fibres do not offer much resistance.

It is most important to prevent, if possible, impaction of the splinter in the posterior surface of the iris. The shape (like that of a cucumber seed) of the particle is generally such as to facilitate its sliding around the lens, and its passage through the pupil, but occasionally it is jagged, when the danger of incarceration is enhanced. In order to avoid this accident, two precautions should be always adopted.—(1) To dilate the pupil fully before operation; and (2) To open the contact immediately the particle reaches the iris. The patient's head should not be fixed, so that there may be no obstacle to the safeguard afforded by the reflex withdrawal of his head set up by the pain experienced when the splinter touches the iris. The field of operation must be well illuminated. When the splinter has reached the iris without entanglement, it must be attracted into the anterior chamber by turning the eye towards the side where the splinter lies and applying the magnet.

When the fragment becomes incarcerated in the iris, it must be attracted in this or that direction, the utmost care being taken to prevent it becoming fixed in the ciliary body. These attempts failing, Haab adopts one of the two following plans: (1) Introducing the hand magnet behind the iris through an incision in the cornea, or by using Lang's cable, which consists of a thin bundle of soft iron wires with suitable tip, which can be attached to the large magnet, and which acts like the hand magnet; (2) Making an irido-dialysis by means of a marginal corneal incision and seizing the iris and drawing it towards the pupil with forceps. The tip of the large magnet or cable is then introduced into the anterior chamber and the splinter extracted. Iridectomy (which Haab has never been compelled to perform in some 300 operations) should be omitted, whenever possible. Neither should irido-dialysis be made the rule.

Once in the anterior chamber the particle may be dealt with in one of two ways. It may, for instance, be extracted by the giant magnet, either through the wound made by the splinter, if such exists, or through a vertical incision cut with a cataract knife about midway between the centre and the margin of the cornea, during which the aqueous humour should not be allowed to escape. Haab does not approve of a peripheral corneal incision. The particle may also be removed from the chamber by means of the hand magnet.

Operation through the sclera should be the exception. Haab's reasons for this view may be briefly stated as follows: (1) Greater injury by reason of an incision entering the vitreous and the introduction of an instrument into the eye; (2) A full use is not made of the distance action of the giant-magnet; (3) The possibility of a superadded infection from the conjuntival sac; (4) The loss of time on account of the necessity for localization.

That brings us to the vexed question of localization.—In using the giant magnet, according to Haab's directions, it is immaterial whereabouts a foreign body is situated in the eyeball. Localization is necessary only when the large magnet fails to draw a splinter forward or to give rise to a painful sensation. If carried out before the application of the magnet, the procedure is a waste of time, thereby favouring the progress of a possible infection. Time is an element of great importance in these cases. Haab is convinced that the splinters resulting from hoeing, which are usually so infective and dangerous, are less liable to cause infection if they are quickly extracted, than if they remain in the eye for a long time. Another reason for rapid extraction is to be found in the fact that a foreign body in the vitreous, especially in its posterior part, may cause permanent damage to the macula lutea, even although it be situated at some considerable distance from that region. In short, Haab is reaching the conclusion that praise accorded to the primary localization of a foreign body is the result of the use of insufficiently powerful magnets.

The field for the small magnet is a very limited one. It has always been the best instrument actually to grasp the magnetic splinter, and on that account, can be used in the extraction of the particle from the anterior chamber, although (as Haab points out) this can be accomplished just as well with the large magnet, especially with the addition of Lang's cable.

Haab does not approve of operation in the recumbent position, and he thinks it important that the surgeon himself should be able to close the current by means of his foot.

Finally, we are informed that the latest model of the giant magnet is constructed by the Oerlikon Engine Works, near Zurich.

SYDNEY STEPHENSON.

VI.—OPERATIONS.

25.—Anæsthesia.

(1) **Walter, Will.—Gas-oxygen analgesia in eye, ear, nose, and throat surgery.** *Ophthalmology*, April, 1916.

(2) **Traquair, H. M.—Local anæsthesia in enucleation of the eyeball.** *Ophthalmic Review*, April-May, 1916.

(3) **Traquair, H. M.—Enucleation of the eyeball under local anæsthesia.** *Edinburgh Medical Journal*, May, 1916.

(2 and 3) These two communications by **Traquair,** of Edinburgh, cover much the same ground, although the one published in the *Ophthalmic Review*, as is perhaps fitting, is more detailed than the other.

In a series of twenty-seven enucleations of the eyeball under local anæsthesia Traquair has obtained satisfactory results. The anæsthesia was complete in 78 per cent., nearly perfect in 11 per cent., and unsatisfactory in 11 per cent. It was not necessary to resort to a general anæsthetic, "the three unsatisfactory cases being so classed, not because the pain was unbearable by the patient but because the result was definitely disappointing to myself." The average age of the patients was fifty-two years, the youngest being nine years and the oldest seventy-six years. There is no doubt, in Traquair's mind, that the unsatisfactory results were accounted for by some variation or omission in the *technique*. If the method, to be presently described, is properly carried out, the author thinks that there should never be a failure in the anæsthesia. Moreover, the condition of the eyeball, such as acute inflammation, need not be taken into account. He concludes that the abrogation of pain is secured by local anæsthesia, while the *rôle* of general anæsthesia in ophthalmic surgery is the production of a passive patient.

A brief description of the *technique* adopted by Traquair may be given.—Two solutions are used:—No. 1 contains Novocain gr. viii, cocaine hydrochloride gr. ii, sodium chloride gr. ii, potash sulphate gr. 1½, adrenalin (1 : 1000) ♏ viii, and distilled water to 1 oz. No. 2 contains:—Novocain gr. iv, cocaine hydrochloride gr. ½, sodium chloride gr. ii, potassium sulphate gr. i, adrenalin (1:1000) ♏ v, and distilled water to 1 oz. A 4 per cent. or 5 per cent. solution of cocaine is dropped into the conjunctival sac. (Adrenalin is also recommended in the communication in the *Ophthalmic Review*). With an ordinary hypodermic syringe, about 0.5 cc. of the stronger, No. 1, solution is injected over the insertion of the recti muscles, thus employing up to 1 cc. to 2 cc. of that solution. In the next step, employing a larger syringe, holding about 5 cc. and armed with a fine needle, about 4 cm. long, deep injections are made at the outer and inner sides of the eyeball, using altogether from 3 cc. to 5 cc. of the weaker, No. 2, solution. The injection is begun as soon as the needle-point penetrates the conjunctiva, and is slowly continued as the needle is gradually pushed on until the periosteum near the apex of the orbit is reached. The needle is then slightly withdrawn and a little more of the solution injected. The operation may be commenced in about two minutes. The few minutes occupied by the enucleation may be rendered easier for the patient by engaging him in conversation.

After the enucleation, the patient walks to bed, and, if the domestic arrangements are suitable, may return to his home on the same or the following day.

SYDNEY STEPHENSON.

VII.—REMEDIES.

(Fifth Notice.)

(1) **Delorme, A.—The treatment of gonorrhœal purulent ophthalmia by the vaccine of Nicolle and Blaizot. Le traitement de l'ophtalmie purulente gonococcique par le vaccin de Nicolle et Blaizot.** *Archives d'Ophtalmologie*, mars-avril, 1916.

(2) **Bradburne, A. A.—Massage in glaucoma.** *Ophthalmoscope*, April, 1916.

(3) **Maddox, Ernest E.—Note on overstrained eyes and their treatment.** *Ophthalmic Review*, April-May, 1916.

(4) **Prince, A. E.—Frozen carbon-dioxide in the treatment of trachoma, vernal catarrh, and pterygium.** *Archives of Ophthalmology*, May, 1916.

(1) **Delorme,** of Bordeaux, has treated eight cases of gonococcal ophthalmia with Nicolle and Blaizot's vaccine. The series included five males and three females, whose ages ranged from 15 to [illegible] years, and averaged [illegible] years. [illegible] bilateral [illegible] unilateral. Gonococci (not always in pure culture) were found in all, both smears and blood agar being employed in the search. In most of the patients permanganate and argyrol were used in addition to the vaccine. As regards results, 6 cases were successful and 2 failed. Of the former, 5 were particularly severe, presenting corneal ulceration from the beginning. Complete arrest of suppuration in 2, 3, 5, and 6 days. [illegible] 8, 10, 11, 12, and 16 days. One patient [illegible] 15 days [illegible] the vaccine treatment had been interrupted too soon.

Delorme knows of no counter-indication to the treatment. He concludes that the vaccine should be employed in these cases concurrently with the ordinary measures.

It should be added that Delorme gives a *résumé* and analysis of the various communications that have been published dealing with Nicolle and Blaizot's vaccine (See THE OPHTHALMOSCOPE, 1914, pp. 57, 116, 117, 118, and 316.) SYDNEY STEPHENSON.

(2) This communication by **Bradburne**, of Manchester, was published in the *Medical Press and Circular* of December 8th, 1915, and has already been abstracted in the columns of THE OPHTHALMOSCOPE (*see* January, 1916, page 54).

(3) Among the symptoms of eyestrain, **Maddox**, of Bournemouth, enumerates: (1) An increase in intra-ocular tension, varying from T. + ½ to T. + 1; (2) Aching eyes; and (3) Increased sensibility of the eyes to light and cold.

With regard to the first-named of the above symptoms, by timely treatment (so the author believes) many cases of glaucoma may be prevented. Although there is said to be no cupping of the disc or diminution of the visual field, the question may be raised whether these are not instances of glaucoma in the earliest stage. The question is impossible to decide, since the tension was taken by the finger and Bjerrum's sign was apparently not looked for. Apart from this, the condition is to be relieved by the correction of ametropia, temporary rest of the eyes, and by sponging the eyelids with very hot water the last thing at night. A drop of a 0·5 per cent. solution of pilocarpin instilled for a week into each eye at night is often to be recommended. SYDNEY STEPHENSON.

(4) **Prince,** of Springfield, has found carbon-dioxide of the greatest service in the treatment of trachoma. The installation he describes is modest, and may be fixed in any corner of the surgeon's consulting-room. The parts are rendered anæsthetic by a ten per cent. solution of cocaine in adrenaline chloride (1 : 1000) or in sensitive individuals, by the subconjunctival injection of a 2 per cent. solution. In children applications are rendered painless by the hypodermic injection of morphin and hyoscin, or, exceptionally, by the administration of chloroform. Prince injects ¼ gr. of morphin and $\frac{1}{100}$ gr. of hyoscin for a person weighing 150 lbs. After free exposure, every part of the diseased conjunctiva is frozen by the application for two seconds of the carbon-dioxide ice.

The author is also pleased with the action of the remedy in cases of spring catarrh and of pterygium. SYDNEY STEPHENSON.

BOOK NOTICES.

The Principles and Practice of Perimetry. By LUTHER C. PETER, A.M., M.D., F.A.C.S.; Associate Professor of Ophthalmology, Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmologist to the Rush Hospital for Consumption and Allied Diseases. Illustrated with 119 engravings. Lea & Febiger: Philadelphia and New York, 1916. Cloth, $2.50 net.

The widespread interest which has been taken of recent years in the study of perimetry had made it probable that before long a monograph devoted to the subject would make its appearance. Dr. Peter's book is therefore both timely and welcome. We believe we are right in saying that it is the first work of the kind in the English language devoted entirely to the study of perimetry.

The text-book way of dealing with such a subject is to take it piecemeal under each successive heading of a disease or injury in which it plays a part. The effect of this is too often to give the student a ragged and uneven conception of the scope and value of the method. Such a work as the present gives the reader an opportunity of looking at "Perimetry" in the large. The brain surgeon, the neurologist, the rhinologist, and the ophthalmologist may meet here to study conditions which are of interest to each and to all alike. The overlapping of their coterminous interests is not ruled out by the exigencies of writing a work which is of interest to one of them alone. The printing is excellent, as also is the general get-up of the book, a valuable feature of which is the use of different types for different classes of headings; this makes it possible to run over the work again rapidly at a later date, in order to obtain a comprehensive view of the whole.

The first chapter is introductory, and is clear and interestingly put. Part II. deals with the various methods of examining the visual fields, and with the means of charting the results obtained. Whilst Peter is evidently not an enthusiast for the self-recording perimeter, he does not go to the lengths some recent writers have done in its condemnation. It is, further, of interest to record that he is not in favour of self-lit instruments. His advocacy of the campimeter and of conducting perimetry at a distance of 6½ inches comes with something of a shock to the reviewer, who is bound to confess that the arguments brought forward in support of this position leave him quite unconvinced. Nevertheless, they are ably and interestingly put, and it is better that the reader should study them at first hand, and make up his own mind only after doing so. Part III is devoted to a study of the anatomy and physiology of the visual tracts. It is difficult to write a book at once for the student and for the expert. Peter has avowedly studied the interests of the former, rather than of the latter. This excuses some of the dogmatic statements that occur in this chapter, statements which, to the reviewer's mind at least, outrun the acknowledged facts on which they are based. Part IV deals with the various forms of scotoma, and with the different alterations found in the size and shape of the fields. It gets right down to bed-rock from the student's point of view, and is an excellent presentation of the subject, at once clear, concise, and educative. The special pathology of the fields is considered in Part V, and for this purpose the visual tract is divided into the following parts:—(a) the intra-ocular, including the choroid, the retina, and nerve-head;

(*b*) the nerve proper; (*c*) the chiasm; and (*d*) all behind the last-named structure. A defence of the inclusion of the choroid is embraced in the statement. The chapter contains a vast amount of instructive matter in a very readable and pleasant form. One of the most interesting samples is to be found in the paragraph devoted to "green vision" in connection with the detachment of the retina. Part VI takes up the alteration in the visual field in the course of functional nervous disturbances.

The book is so good as to be assured of a re-appearance in a second edition. It is, therefore, to be hoped that when that time comes, the author will see his way to rectify certain small matters which, to the English reader at least, detract in some measure from the pleasure of reading what is otherwise a most acceptable work, *ex. gr.*, "Bjerrum's sign" should not be spoken of as "Bjerrum's symptom" (p. 143); "œdema" should not be spelt "edema"; some instances of defective construction should be put right: one of the worst of these is met with near the bottom of page 107. Obscurities of meaning occur in a few passages; the most marked of these are to be found in the lower half of page 175, and towards the bottom of page 208. These criticisms are not offered in any carping spirit. The reviewer has always held that American ophthalmology has a world-mission before it. Such books as the one Peter has written will go far beyond the confines of the United States, and will reach and teach the world-flung peoples who are proud of their heritage of the English tongue. It is possible that some of the points to which attention has been drawn may seem trivial to the American reader, but it is certain that they will have a definite influence on the popularity of the book in the minds of many readers outside the United States. The Old World may seem to the New to be ultra-conservative, and such an opinion may be justified in many cases. There are, however, things to which it clings tenaciously. Such should not be lost sight of by one who would reach the wide circle of readers, which we heartily wish for Dr. Peter's book. The suggestions that have been made emanate from a friend and a well-wisher of transatlantic ophthalmology. R. H. ELLIOT.

County of Lanark Secondary Education Committee. Sixth Annual Report on the Medical Inspection and Supervision of School Children, 1914-1915. Coatbridge: Printed by Alex. Pettigrew, Ltd., 54, Main Street.

The position of the County of Lanark in the matter of ophthalmic treatment at present stands alone in Scotland. The fact that twenty urban and rural districts (including thirty-nine school boards) should be in the charge of one and the same oculist, opens up opportunities of obtaining most valuable statistics, which, one may rest assured, are not likely to be neglected by the present incumbent of the office, Dr. Ernest Thomson.

In the absence of the general medical staff on war duty, it has devolved upon the ophthalmic surgeon to write this report upon medical inspection and treatment.

With the general body of the report we shall not attempt to deal; but it may be of interest to readers to review that part dealing with the ophthalmic surgeon's work proper.

The plan of dealing with children whose eyesight is defective, that has been adopted some months after the outbreak of war, and in the absence of the medical officers on service, may be shortly described as follows.—Children with visual defects are picked out by the school nurses (of whom three are employed), and the children are given forms of application for treatment, which they hand to their parents. When filled up, the form is sent by the parents to the headmaster of the school. The parent is notified of the date on which the ophthalmic surgeon will visit a given centre. Only a certain number of children are called up, and over 60 per cent. of those notified attend. The necessity of punctuality is emphasised. The method of dealing with refraction work essentially represents a compromise.—Atropine is applied to the eyes at the centre, and the static refraction is worked out by the ophthalmic surgeon an hour or so later. Spectacles, when prescribed, should be obtained before the effect of the drug upon the eye has passed away, so that the child may easily become accustomed to their continued use. A contribution to the cost of spectacles is paid by the better-off parent, but they are provided free in cases where the parents are necessitous; that is to say, earning 30s. a week or under, or not more than an average of 5s. per each member of the family. So far no steps have been taken to compel a parent to obtain spectacles for his child, although such failure undoubtedly amounts in certain cases to serious neglect.

As regards the treatment centres, of which there are twenty scattered about the county, some evidently leave much to be desired in the several matters of size, lighting, warming, and general upkeep, as well as in proper waiting rooms for children and parents, and Dr. Thomson urges the necessity of what he calls a "standard accommodation" in all the premises.

The author addresses some timely remarks to school teachers respecting children's spectacles, laying stress upon the necessity of constant use, especially in astigmatism, of seeing that all frames and glasses are kept in order, and of thoroughly understanding the conditions under which attendance at school may be allowed after the use of atropine. These recommendations deserve and should receive the widest publicity.

Dr. Thomson finds that the serious cases of myopia amount to 12·2 per cent. of the total cases of myopia in his urban centres, as compared with 10 per cent. in his rural centres. Every effort is made to keep these serious cases under close observation.

Speaking of word-blindness (of which two cases were seen during the period of one year covered by the Report), the author speaks of affected children as "never able to learn letters or words." In the reviewer's experience, however, many of the milder cases eventually learn to read tolerably well, even when no special means of instruction are adopted. SYDNEY STEPHENSON.

NOTES AND ECHOES.

Deaths.

WITH deep regret we record the death of Charles Edward FitzGerald, which took place on May 27th, at the age of 73 years. He was the son of the late Baron F. A. FitzGerald, a distinguished Irish judge. Charles Edward FitzGerald was born in Dublin and educated at Trinity College, where he took the B.A. degree in 1864, the M.B. and M.Ch. degrees in 1868, and the M.D. in 1873. He took the M.R.C.P. Ireland in 1885 and the F.R.C.P. Ireland in the following year. In 1873 FitzGerald was appointed ophthalmic and aural surgeon to the House of Industry Hospitals. Later he became surgeon to the National Eye and Ear Infirmary, but on amalgamation of the latter with St. Mark's Ophthalmic Hospital to form the Royal Victoria Eye and Ear Hospital, he retired from active participation in hospital work. Fitzgerald was lecturer on ophthalmic surgery in the Carmichael School of Medicine and Professor in the Royal College of Surgeons, Ireland. His greatest distinction, however, was reached in 1876 when he was appointed honorary surgeon-oculist to H.M. the Queen in Ireland. Another signal honour was his election as President of the Royal College of Physicians, Ireland, in 1912. At the termination of that office he presented to the College a badge of office to be worn by his successors. FitzGerald enjoyed a large practice, and remained at work until within a few days of his death.

It is with regret that we announce the death, at the age of 65 years, of Silvanus Phillips Thompson, the distinguished physicist, which took place at West Hampstead on June 12th, after a very brief illness. Professor Thompson was, perhaps, best known for his work in optics and in electricity. Since 1885 he has held the positions of Principal and Professor of Physics in the City and Guilds Technical College, Finsbury. It is of interest to note that our colleague, John Tatham Thompson, who died in 1911, was the brother of Professor Silvanus Thompson, and acted as demonstrator of Physics when the latter held the post of Professor of Experimental Physics in University College, Bristol.

The following deaths are announced from the continent of Europe:—Friedrich Erismann (1842-1915); Richard Ulrich (1849-1915); Otto Brecht (1864-1915).

* * * *

Appointments.

THE KING has appointed Mr. John B. Story to be Honorary Surgeon-Oculist to His Majesty in Ireland, in room of the late Dr. C. E. FitzGerald.

Mr. William Lang has been elected President of the Section of Ophthalmology of the Royal Society of Medicine for the year 1916-1917.

Mr. Sydney Stephenson has been elected President of the Section for the Study of Disease in Children of the Royal Society of Medicine for the year 1916-1917.

Mr. John B. Story has been elected Vice-President of the Royal College of Surgeons of Ireland.

Lieutenant-Colonel Henry Smith, I.M.S., of Amritsar, India, has been appointed consulting ophthalmic surgeon to H.M. Forces in Mesopotamia.

Dr. H. W. Wandless has been appointed clinical professor of ophthalmology in the New York University and Belle Vue Hospital Medical College.

Dr. A. H. Riedel has been nominated chief of clinic at the new Eye Dispensary of the West Side German Hospital, New York.

Drs. J. A. Brophy and H. M. Langdon have been appointed visiting ophthalmologists to St. Agnes' Hospital, Philadelphia.

* * * *

The Army Standard of Visual Acuity.

WE would draw the attention of our readers to the cogent argument brought forward by J. V. Paterson and H. M. Traquair, of Edinburgh (*Lancet*, May 6th, 1916), in favour of abandonment by the British Military Authorities of their present standard of visual acuity for recruits. It seems that Britain stands alone in demanding a certain standard of acuity *without correction.* Now this standard is the low one of 6/24 in each eye, or, 6/24 in the right eye, 6/60 in the left eye for general service; for auxiliary service 6/60 in the right and 6/24 in the left is allowed. Correcting glasses are permitted in home and garrison service. The continental powers, on the other hand, accept 6/12 in the better eye *with glasses.* In France and Germany the worse eye may even be blind for the Auxiliary Services. In their summary the authors say that the British sight-test, the highest in Europe, excludes from the fighting line men who would be accepted by the continental powers, and that in view of the present want of men, there is urgent need for the adoption of a sight-test based on corrected vision.

It is a striking comment on British methods that, while the authorities say that "the British visual standard was fixed by a mixed committee of military officers and ophthalmic experts," the Ophthalmological Society of the United Kingdom has not been consulted since 1906.

* * * *

The Workmen's Compensation Act.

It may be of some interest to ophthalmic surgeons who deal with cases under the Workmen's Compensation Act to learn that certain modifications have been made in the descriptions of industrial diseases, the main object of which is to make it clear that the Act applies to cases of (1) T.N.T. poisoning and poisoning by other nitro- and amido- derivatives of the homologues of benzene; and (2) dermatitis produced by substances such as picric acid, fulminate of mercury, etc., whether accompanied by ulceration of the skin or not—these diseases being liable to occur particularly among workers in explosive and other factories engaged in the manufacture of munitions of war.

It must be borne in mind that ocular symptoms cannot be excluded from the more general ones which may arrive from working amongst the above-mentioned chemical compounds.

* * * *

Index of "La Clinique Ophtalmologique."

We have received May, 1916 an index of the contents of *La Clinique Ophtalmologique*, edited by R. Jocqs, A. Darier, and L. Dor, dealing with the first twenty years of issue of that useful periodical, 1895 to 1914. The *brochure*, owing doubtless to the exigencies of the War, bears the date December, 1914. We congratulate all concerned upon the appearance of this comprehensive index.

* * * *

A School of Technical Optics.

Now the help of Mr. Lloyd George has been enlisted, there is a prospect that a school of technical optics will be established on a national basis. The urgent need for an imperial school of technical optics has been set forth in a circular issued by the Minister of Munitions. In that document emphasis is laid upon the vital importance of optics in such aids to national defence as periscopes, sextants, and range-finders, the dearth of which is characterised by the circular as "nothing less than a national disaster." All important branches of the optical trade have now for many years been controlled by German makers, aided by generous state subsidies. Yet this was essentially a British industry until the latter half of the XIXth Century. Obviously, the first step in regaining our ascendancy is to establish a technical school where skilled workers in optics may be trained. Since the year 1898, the Northampton Polytechnic Institute in Clerkenwell has held the only courses in technical optics in the United Kingdom. In that year they obtained (with borrowed money) a suitable site, but if the latter is to be kept, money will have to be found speedily. It is estimated that a suitable building could be put up at a cost of about £40,000. Mr. Lloyd George now appeals to the generous consideration of all patriotic citizens who are able to assist in the establishment of the proposed school. "Their contributions will be welcomed by none more than by those who are specially concerned in seeing that our gallant armies are provided with the most efficient equipment to fight a ruthless foe armed with the best weapons science can produce."

* * * *

The Composition of "Eusol."

IN reviewing a recent communication in these columns (THE OPHTHALMOSCOPE, April, 1916, p. 222) we stated that "Eusol" contained 0·5 per cent. of hypochlorous acid. We gather, however, from letters published in the *Lancet* and *British Medical Journal* of May 20th from W. J. Lorrain Smith and Theodore Rettie, that the solution in question contains not 0·5 per cent., as they originally stated, but approximately 0·27 per cent. The formula for the preparation of the new antiseptic is given as:—"Bleaching-powder, 12·5 grammes; boric acid, 12·5 grammes; water, 1 litre." With the best samples the percentage of hypochlorous acid in this solution rises to 0·3, but bleaching-powder of B.P. standard gives 0·27 per cent. of hypochlorous acid.

* * * *

The Notification of Ophthalmia Neonatorum

WE learn from a Local Government Board Report (New Series, No. 109) on the statistics of the incidence of notifiable infectious disease in each sanitary district of England and Wales that during the year 1915, 6,806 cases of ophthalmia neonatorum were notified. Otherwise expressed, there were 8.34 cases per 1,000 births. Of this number, 6,495 came from England, 307 from Wales, including Monmouthshire, and 4 from Port Sanitary Districts. Seven hundred and forty-one cases were derived from the Adminstrative County of London. It may be of interest to quote figures from some of the more populous county boroughs as follows:—Birmingham, 326 cases; Liverpool, 495; Manchester, 584; Stoke-on-Trent, 247; Sheffield, 195; Nottingham, 126; Salford, 98; Bristol, 95; Bradford, 87; Leeds, 81; Hull, 80; Leicester, 67; West Ham, 42; Portsmouth, 26; Newcastle-on-Tyne, 24; Brighton, 24; Plymouth, 21; Southampton, 21; and Oldham, 18. The notifications of ophthalmia neonatorum exceed in number those of enteric fever (6,364), puerperal fever (2057), and cerebro-spinal fever (695), to say nothing of small pox, typhus fever, continued fever, and polio-myelitis. It stands, in fact, fifth on the list of the notifiable diseases mentioned in this report.

* * * *

One-eyed Recruits.

ON June 2nd the War Office announced that men with but one eye were to be considered as eligible for some forms of military service.

* * * *

Prize in Ophthalmology.

TO DR. FERDINAND ROUSSEAU, of Paris, has been awarded the prize of 5,000 francs for the best *mémoir* dealing with the ætiology, the prophylaxis, and the treatment of those forms of iritis, irido-cyclitis, or of cyclitis which are not due to syphilis. The jury consisted of Drs. Chaillous, Dupuy-Dutemps, and Morax. Dr. Rousseau's essay was published in the *Annales d'Oculistique* of April last. The prize, it will be remembered, was offered through that periodical (see THE OPHTHALMOSCOPE, 1914, p. 520).

* * * *

Fellowship in the University of Minnesota

IT is announced that applications may now be made for the Fellowship in Eye, Ear, Nose, and Throat at the University of Minnesota to Dr. Frank C. Todd or to Dean Daniel Ford. The appointment is for three years, during which the holder devotes his whole time to his preparation as a specialist in the branches named and serves as an assistant in the clinic. The Fellowship carries with it an honorarium of 500 dollars the first year, 750 dollars the second year, and 1,000 dollars the third year. A degree, Doctor of Science, is granted at the expiry of the appointment.

* * * *

An interesting Case.

THE *Lancet* (April 8th, 1916) comments upon a joint article in *Brain* (December, 1915) by Byrom Bramwell, of Edinburgh, Professor Shaw Bolton, of Leeds, and William Robinson, of the West Riding Asylum, Wakefield. The case, in essentials, was that of a man who had lost peripheral vision and retained macular vision for 24 years. At the autopsy, followed by more precise microscopic examination, the conditions found led the authors to conclude that "the calcarine core of the pear-shaped visuo-sensory centre serves as an anatomical basis for macular or central, as distinct from non-macular, peripheral, or panoramic vision, while the latter is represented in the surrounding and remaining visuo-sensory cortex. It is probable that human macular vision is an evolution dependent on the development of the faculty of using corresponding parts of the retinæ simultaneously, and that it is superposed on the neuronic apparatus for panoramic vision, the two types shading into one another."

* * * *

The Middlemore Lecture

MR. BERNARD CRIDLAND, of Wolverhampton, will deliver the Middlemore Lecture for 1917. The subject has not yet been announced.

* * * *

American Ophthalmological Society. AT the recent meeting of the American Ophthalmological Society in Washington, the following officers were elected:—Peter Callan, of New York, President; William H. Wilder, of Chicago, Vice-President; William M Sweet, of Philadelphia, Secretary and Treasurer (re-elected). William R. Parker, of Detroit, was elected Chairman of this Committee.

THE OPHTHALMOSCOPE DIARY.

	1916.	
Oxford Ophthalmological Congress.	July 13th & 14th	Keble College, Oxford.
American Academy of Ophthalmology and Oto-Laryngology.	Dec. 11th, 12th, & 13th, 1916	Memphis, Tenn.

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ORIGINAL COMMUNICATIONS.

LEBER'S DISEASE (HEREDITARY OPTIC ATROPHY): A SUGGESTION AS TO ITS CAUSE.*

BY

J. HERBERT FISHER, M.B., B.S.(Lond.), F.R.C.S.,

LONDON, ENGLAND.

LARGE numbers of cases of Leber's hereditary optic atrophy or hereditary optic neuritis have been collected since attention was first drawn to familial amaurosis by Beer in 1817, and it is interesting to note that Beer made the observation in his paper that, in the third generation of the family with which he was concerned, several female members became amaurotic at the climacteric period.

In a case by Travers in 1821 three members of a family became both blind and epileptic at the age of puberty. Leber's paper, which was published in 1871, collected all the cases reported in the early literature up to that date. He noticed a great tendency to the onset of the visual defect at or about the age of puberty, and, while he distinctly excluded all cases arising from organic cerebral disease and from meningitis, he thought that individuals of the neuropathic type were especially prone to be attacked. The evidences of the diathesis were afforded by such symptoms as headache, vertigo, tremors, numbness of limbs, or even epileptic attacks. In Leber's experience, the onset was usually rapid, and both eyes were affected, not infrequently to a different degree and not always simultaneously, although the interval between the onset in the two eyes was never more than six months. The establishment of a central scotoma with depreciation of direct vision is a feature which is characteristic of the visual defect, and concentric contraction of fields is rare. Especially if ophthalmoscopic examination can be made at the opportune moment, some, although very slight, evidence of œdema in the head of the optic nerves will be recognised. This feature is, however, inconspicuous and fleeting, and is soon replaced by pallor of the optic discs, especially in the outer half, and spreading generally over their surfaces.

Since the appearance of Leber's original paper, large numbers of cases of familial hereditary optic atrophy have been published, and little would now be gained by adding to the number, unless by so doing some advance in our knowledge as to the cause and treatment of this still totally unexplained condition could possibly be made.

Nettleship, with characteristic thoroughness, in the Bowman lecture which he delivered before the Ophthalmological Society of the United Kingdom in 1909, collected the cases of this disease up to that date. Probably in his exhaustive collection there are many cases, which, if fuller information were forthcoming, might have to be excluded from the Leber group, and certainly among many cases reported at various meetings of this Society, a considerable number have been included which might be considered to depart from the typical picture laid down by Leber. This is particularly the case in regard to some of those in which contraction of the fields of vision accompanied the depreciation of function of the central portion of the retina. In this connection, however, I would particularly draw attention to the case of C.E.C., reported by the late Simeon Snell, in Vol. XVII of the *Transactions of the Ophthalmological Society U.K.*, page 68, and accepted as an instance of Leber's disease. The remarkable fields of that case (Fig. 1) could not, in my opinion, be explained by any atrophy in the optic nerve fibres dependent upon the organisation of inflammatory products in the two optic nerves. The symmetry of the two fields points very strongly to direct implication of the visual pathways by a single lesion.

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* [illegible] Ophthalmological Society [illegible] United Kingdom [illegible] May [illegible]

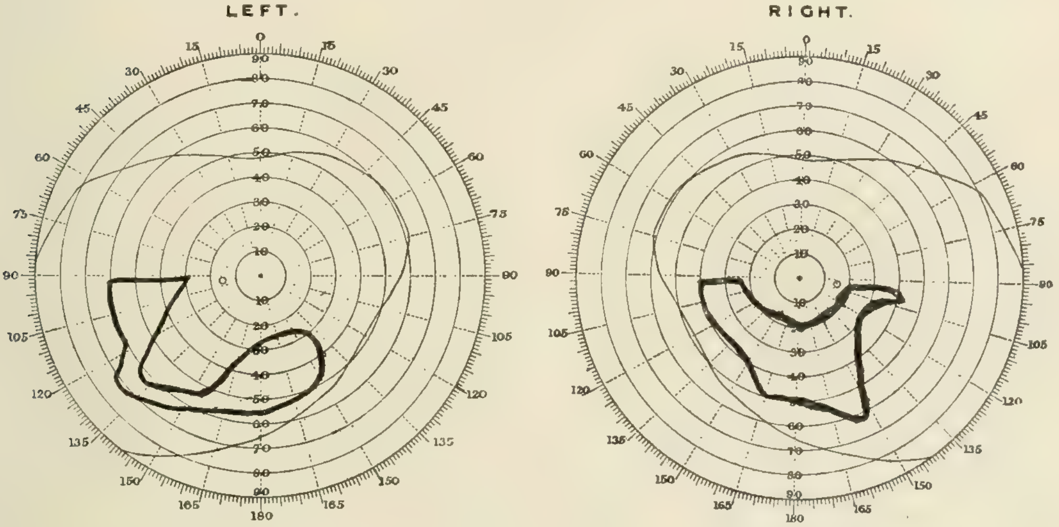

FIGURE 1.

Our experience of papillœdema, which, we all know, may be of great intensity without necessarily producing serious damage to vision, does not lead us to think that the very slight and transient changes seen at the onset with the ophthalmoscope in Leber's disease, can be adequate to explain the serious and permanent loss of function which ensues. If we suppose that the blurring of the discs is the anterior expression of retro-bulbar changes in the optic nerves, such retro-bulbar changes must lie close behind the lamina cribrosa, and be symmetrical in the two nerves : we do not get congestion evidences at the papillæ, in cases of retro-bulbar neuritis, when the lesions are situated as far back as the optic foramina, *e.g.*, when dependent upon a mucocele of the air cell in the body of the sphenoid bone. If we look on Leber's disease as an atrophy of nerve fibres secondary to neuritis, we have to explain the possibility of a heritable tendency to isolated implication of the optic nerve fibres by inflammatory processes close behind the eyeballs, and a special vulnerability of the papillo-macular fibres, with a tendency to synchronous onset in the two eyes at special epochs of life. Such a hypothesis is almost untenable, in view of what we know as to the causes of inflammation, and while ophthalmic surgeons, *faute de mieux*, acquiesce in it, there can be few of us who are satisfied with it.

Nettleship in 1897 (*Transactions of the Ophthalmological Society U.K.*, Vol. XVII, p. 277) read a paper entitled "Central Amblyopia, as a symptom in Tumour of the Chiasma." This important communication is sufficiently well-known. Cases where a central scotoma might easily have led to a diagnosis of tobacco blindness, ultimately developed hemianopia, frequently bi-temporal, by expansion of the scotomata to the temporal peripheries of the fields, and the patients subsequently died with intra-cranial symptoms, indicative of organic cerebral disease: proved by *post mortem* examination in one case to have been a large cyst in the interpeduncular space.

A large amount of work dealing with disease of the pituitary body has been done in the last few years.

The loss of temporal field in these cases quite frequently starts as a central scotoma expanding to the outer periphery. It has occurred to me that if a disturbance of the pituitary body of temporary duration and moderate degree can be imagined, such a lesion might be adequate to explain the phenomena of Leber's hereditary optic atrophy, in which case the inherited tendency would not lie in a special vulnerability of the macular fibres of the optic nerves, but in a liability of the pituitary body to such limited disorder as I here suggest.

A priori it is to me much easier to imagine an inherited tendency to disorder of the hypophysis than a family tendency on the part of the papillo-macular fibres of the optic nerves to degenerative or inflammatory attacks.

If there are any facts which support the suggestion I make they should be revealed, while if the case I put forward were proved, there might be some hope of combating Leber's disease by organo-therapy.

In considering the reported cases of Leber's disease, I think we shall find some points which are certainly suggestive of pathological disturbance or excessive physiological activity on the part of the pituitary gland.

Leber's recognition of the neuropathic type of individual liable to the disease which bears his name is suggestive. Frontal headache, vertigo, and epileptiform attacks, are also met with in cases of pituitary tumour.

We have Nettleship's authority in his Bowman Lecture for the statement that some correlation seems to exist between Leber's disease and epilepsy, while Hughlings Jackson (*Royal London Ophthalmic Hospital Reports*, Vol. V) makes the statement that optic neuritis and optic atrophy do not occur in true epilepsy, but only in epileptiform convulsions dependent on a gross cerebral lesion.

Leber also recognised that patients attacked with this form of atrophy experienced subjective phenomena of light and colour. Patients with rapidly developing pituitary body growths have described to me the symptom of "seeing through a blue mist," and such experiences are also recorded by other observers.

The variations in the degree of central amblyopia before the final stage is reached in Leber's disease are, I think, more consistent with an outside influence on the visual pathways than with primary changes in the nerve fibres. I would not lay much emphasis on this point, but it perhaps somewhat strengthens the point just made, namely, that in Leber's disease the subjective symptoms of coloured haze are paralleled by the same experiences when a diseased hypophysis involves the visual pathways.

The pituitary body, as we now know, is a ductless gland, whose functions are intimately bound up with those of the sexual glands. Being to this extent a part of the reproductive system, pituitary gland tissue might be expected to be especially liable to inherited tendencies. In both sexes Leber's disease commences at or about the age of puberty; the female sex, however, tends to form a second group of cases which date around the menopause.

Long ago Jonathan Hutchinson (*Royal London Ophthalmic Hospital Reports*, Vol. IX, p. 1-15) published an article on the sexual system as a cause of eye disease, in which he finds that in one class of cases, mostly males, the sight fails at or about puberty; in women, he states, cases of eye disorder are more common at or about the climacteric period—he has in mind Leber's disease.

Swale Vincent ("Internal Secretion and the Ductless Glands," 1912, p. 402) states that "in pregnancy the pituitary may become hypertrophied to two or three times its normal size. The increase consists entirely in the glandular portions" (that is to say anterior lobe).

"The pituitary during pregnancy resembles an epithelial tumour. The increase in the amount of secretion is seen by the fact that one can squeeze a milky juice out of the gland.

"The hypertrophy persists to a certain degree even after pregnancy, so that the size of the gland in a multipara may be three times as great as that of a normal gland."

Erdheim and Stumme (Zeigler's *Beiträge*, June, 1909) state that in pregnancy such a striking symptom as hemianopia may be produced by the effects of the pituitary tumour. In an organ which undergoes such remarkable changes as this in association with pregnancy, it would not be surprising to find that changes capable of producing an influence on the adjacent visual pathways occurred at the two critical periods of the female organism, puberty and the climacteric, and that something of an analogous nature occurred at puberty in the male.

If the objection is raised that the onset of Leber's disease corresponds but roughly with the periods of puberty and climacteric, I would point out that consideration of the established correlation between the pituitary body and the sexual glands affords abundant examples where the grosser disorders of the hypophysis are accompanied by precocity in the development of the sexual functions, by permanent infantilism, by onset of impotence, and by premature menopause. Which is the primary factor in this correlation is not yet decided, but in many cases at least the sexual disorder precedes any evidence of pituitary derangement. If Leber's disease be dependent on a lesser pituitary disturbance, a general but not too precise correspondence with the normal sexual epochs is what we should expect.

The reproduction shown (Fig. 2) is a tracing from one of Braune's sections. The section is, as nearly as possible, a mid-line section of a male subject, and shows the immediate relationship which the anterior part of the pituitary gland holds to the optic chiasma. The anterior lobe lies immediately under the chiasma and separated from it only by the anterior segment of the fold of dura mater, known as the diaphragma sellæ. The infundibular stalk depends immediately behind the chiasma from the tuber cinereum to pass through the opening in the diaphragm.

Every other anatomical preparation, diagram, and photographic reproduction of anatomical preparation to which I have referred, clearly demonstrates the same point. The optic chiasma does not lie in the very shallow groove on the body of the sphenoid bone which may sometimes be seen in front of the olivary eminence, and which leads on either hand directly to the optic foramen. The chiasma lies vertically above the sella Turcica and the infundibular stalk passes forwards as well as downwards immediately posterior to the chiasma: in some preparations the chiasma may be found even more posterior in position than I describe; in no preparation is it any more anterior. The diaphragma sellæ, of which the anterior lunula is the only structure which intervenes between the hypophysis and the chiasma, is a very variable membrane. It may vary from a complete tentorium for the sella Turcica, with a central aperture only just large enough to transmit the infundibular stalk, to a very limited fibrous edging or eave to the fossa, in which case the membrane is nearly all aperture. One can conceive that in the one case an attempt on the part of the pituitary to enlarge with any rapidity might give rise to more fronto-temporal headache than in the other; while pressure effects on the chiasma would presumably be more easily produced if the diaphragma sellæ were rudimentary than if it were more complete.

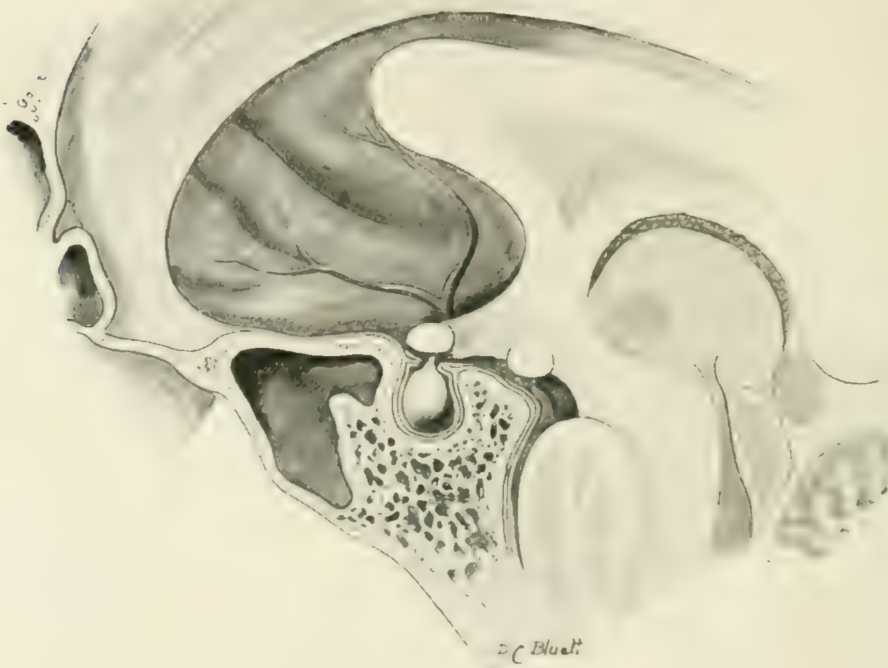

FIGURE 2.

Copy of Braune's mid-line section of skull to show relation of pituitary body to optic chiasma.

It is obvious, however, that, whatever be the development of the diaphragma sellæ, the pituitary body and optic chiasma are in such immediate contiguity that a very small amount of swelling of the former would at once impair the function of the latter structure by mechanical interference. How susceptible is that function as a whole, and especially the papillo-macular portion of it, to slight mechanical impediments we are all well aware from our experience of cases of acute retro-bulbar neuritis when the optic nerve is affected at its passage through the optic foramen.

The rebellious nature of cases diagnosed as tobacco amblyopia when glycosuria is present is well recognised: disorder of the posterior lobe and pars intermedia of the pituitary body is frequently accompanied by glycosuria; the fact is significant and especially to the purpose of this paper when we recall that cases diagnosed as Leber's disease are on record where glycosuria was a symptom. Perhaps all cases diagnosed as tobacco amblyopia complicated by glycosuria should be subjected to more critical investigation than we are accustomed to give them.

In lesions of the optic chiasma, due to pituitary body enlargement or growth, it is alleged that evidences of a very mild papillitis can frequently be detected in the early stages of the trouble, but that such ophthalmoscopic appearances are very slight and very transient—the parallel with Leber's optic neuritis is obvious. Examples of either disease are more often examined in the abiding stage of atrophy, and in this stage the type of atrophy is identical in the two cases, and I believe differs somewhat from the aspect of the disc in primary gray atrophy—ivory whiteness and a suggestion of transparency are presented by the atrophic disc in Leber's disease, and in the late stages of damage done by hypophysis tumour. The capacity for restoration of function in some of the implicated nerve fibres in the earlier stages of both diseases is a further suggestive phenomenon.

If the suggestion that I make should prove to be true, we can easily explain both groups of familial hereditary optic atrophy: according to the degree of the excessive transient disturbance of the pituitary body, associated with the sexual development or decline, we should expect to find examples of visual failure in which central scotoma with full field was the result, and other examples in which with grosser pituitary changes, loss of fields might be expected, comparable with the field contraction which ultimately results

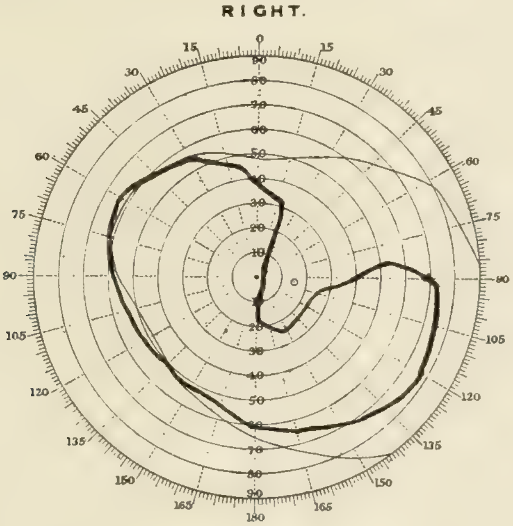

FIGURE 3.

in cases of recognised pituitary body hypertrophy or tumour. Let me again draw attention to the fields of Snell's case of Leber's disease to which I have alluded above (Fig. 1). I have pointed out the symmetry in the right and left field, which leads me to consider the existing cause to be a single lesion involving the visual pathways rather than a haphazard atrophy of the fibres of the two nerves. I revert to these fields at this point to compare them, and especially the left field, with the field of vision of a right eye (his other eye was totally blind) in a patient of my own suffering from gross pituitary disease (Fig. 3), which was not only indubitably diagnosable, but, as the loss of field was progressive and total blindness was threatened, was confirmed by operation and by the favourable result which followed operation. So striking a similarity is, to my mind, more than suggestive that the cause which gave rise to the fields in Snell's case of Leber's disease, was, in all probability, disorder of the hypophysis. Almost identical fields (Fig. 4) are those presented by the case of Allen J., one of three brothers afflicted by Leber's disease and reported by Ogilvie (*Trans. Ophth. Soc. U.K.*, Vol. XVI, p. 116, 1896). In this paper Ogilvie draws attention to the unexplained high infantile mortality which is not infrequently a feature of families afflicted with hereditary optic atrophy. The pituitary body has been proved by Cushing's experiments to be an organ essential to life: total extirpation of the gland, or even of its anterior lobe only, is invariably followed by death.

In one of Ogilvie's cases the sight deteriorated with extreme rapidity — in a single night — leaving a full field. Such a change would be incompatible with an optic papillitis, and although explicable by symmetrical retro-bulbar neuritis, it is not our experience in this disease to get no extension to the ultra-macular fibres in the cases in which the visual defect is permanent.

A certain amount of first-hand knowledge of pituitary disease, coupled with the reflections in which I have been indulging, led me to think of a slight and transient disorder of the pituitary body, implicating the visual pathways, as a possible cause of Leber's disease, and I took the earliest opportunity which offered itself to me to investigate the state of the sella Turcica with X-rays in two cases of typical hereditary optic atrophy. Had the investigation proved negative in each instance, this communication would probably not have been written. In one case, to be briefly narrated; it was negative.

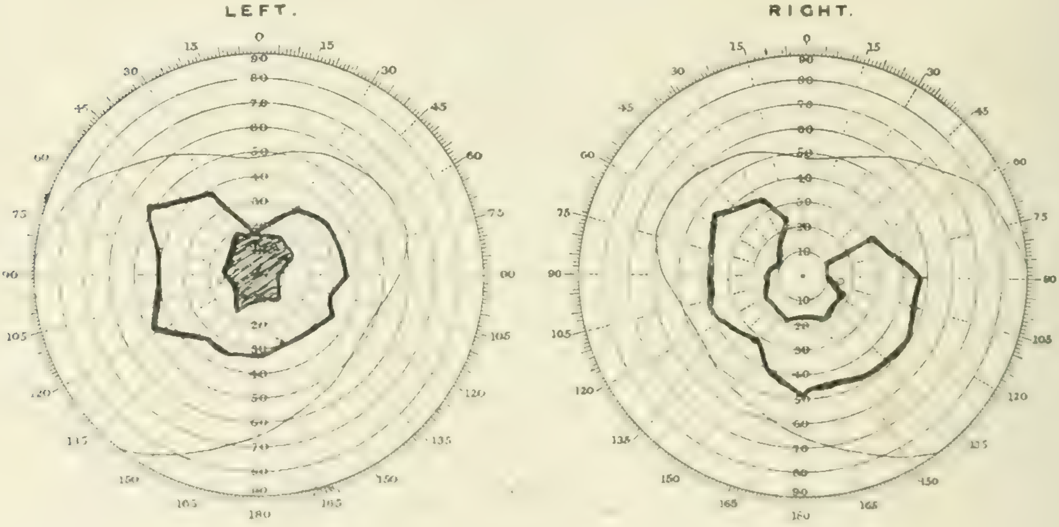

FIGURE 4.

A. G. is a boy now in his fourteenth year, whose sight failed him fairly rapidly when he was in his twelfth year. Up to that age he had been educated in an ordinary school, but during the last two years he has had to be taught in the blind schools of the London County Council. His only sibling is a sister, Rose G., whose case is reported below. The mother of these two, her only children, is dead, but their father has remarried; he has good sight, and by his second wife has seven children, all young, of course, at present, but all said to have normal sight. My two patients A. G. and R. G., who are the subject of typical Leber's disease, no doubt inherited the disease from their mother, who had two brothers reported to be so defective in vision that they had to be educated in a blind school.

I have examined the present condition of the boy A. G.—The direct vision of his right eye is 6/18ths, of his left eye 6/60ths. The fields which I have

LEBER'S DISEASE (HEREDITARY OPTIC ATROPHY); A SUGGESTION AS TO CAUSE.

BY

J. HERBERT FISHER.

charted are both quite full, but in each there is a central scotoma which is mapped out and found to be larger in the left than in the right eye.

Ophthalmoscopic examination shows that each optic disc is strikingly pale—the discs are of the transparent white aspect to which I have alluded ; they show no evidence of past inflammatory change, and are not "filled in." Their pallor is most extreme in their temporal halves.

The Wassermann reaction is negative.

An X-ray examination of the sella Turcica has been made, but the shadow picture shows no departure from the normal.

Rose G., first came under my observation in December, 1915, when she was nearly 11½ years of age. The history shows that she had good sight, and attended school, with no difficulty in doing her lessons, through the whole of the summer term of 1915. During the summer holiday the vision of the right eye began to fail, and on returning to school, considerable sight difficulty was experienced, so that presumably the left eye also was involved to some extent ; the deterioration was progressive, so that by early in November, 1915, school had to be abandoned.

When seen at St. Thomas's Hospital on December 10th, 1915, she was tested under atropin, and each eye found to be hypermetropic 1·0 D. The acuity of direct sight was just 6/60 with either eye with much difficulty.

The ophthalmoscopic note, made by my colleague Mr. A. C. Hudson, was to the effect that the right optic disc was a little hyperæmic, with distended capillaries on its inner part and to a less extent on its outer part. The left optic disc was perhaps a trifle pale. The family history was not at this time elicited, and a provisional diagnosis of retro-bulbar neuritis was made. Mr. W. G. Howarth was asked to report on the nasal air cells. This examination was made, and yielded no positive evidence of sinusitis.

On December 16th, 1915, the child was made an in-patient, under my care, for further investigation, and at a later date, I elicited the family history narrated in A. G.'s case above from the stepmother. This history, coupled with my examination of A. G.'s eyes, left no possible doubt as to the diagnosis of Leber's hereditary optic atrophy.

The fields of Rose G. were charted on January 6th, 1916. On this date a full field was not recorded for either eye, but this is probably to be explained by a want of understanding of her part by a rather young child. Fields with some amount of general contraction all round were obtained. Recorded again on February 23rd, 1916, the fields were found to be quite normal, with no limitation anywhere. An attempt by myself, on February 26th, 1916, to map out the central scotoma which undoubtedly exists was not attended by a result on which I felt I could put reliance, and I have not therefore included it on the chart. By the end of February any evidence of hyperæmia of right optic disc had quite passed away, and at this date each optic disc showed pathological pallor, more marked in the temporal half, and the left optic disc was paler than the right. The direct vision is barely 6/60 ; the top letter is seen, but not reliably recognised.

A Wassermann reaction for Rose G. gave a negative result.

An X-ray examination of the skull has been made on more than one occasion. Some of the reflections which I have made in the course of this paper led me to investigate in this direction, and I sent her with her brother to the X-ray department on February 9th, 1916. The sella Turcica in A. G.'s case, as I have already said, shows no departure from the normal ; but that of Rose G., reveals something which I have never seen before, and with which the X-ray officers are also quite unfamiliar. The sella Turcica is not enlarged and its outline is not distorted, but the depression is filled in with something which gives a cellular or honeycomb-like shadow; the same appearance is exactly repeated in a further skiagraph taken a fortnight later, and again a month later. (In the reproduction the shadow referred to is less defined than in the original.)

I have used as controls two girls and a boy whose ages varied from about 11½ years to 13½ years, and in none of them was any similar appearance found. Whatever causes this honeycomb of trabeculæ in Rose G's. sella Turcica, must be either in the substance or on the surface of the pituitary body. There may be calcareous or other salts, capable of giving a shadow deposited in the gland. At least, the pituitary body in this recent case of Leber's disease is in an abnormal condition.

This positive fact, coupled with the considerations set out above, leads me to suspect that when an opportunity offers to some observer, it will be proved that Leber's hereditary optic atrophy is primarily due to an inherited temporary disorder of the pituitary body. That no similar changes in the sella Turcica of A. G. could be shown by X-rays is no argument against my observation. His is a case of over two years' standing. Leber's disease, as far as visual symptoms are concerned, is progressive up to a certain point, and then comes to rest. If the lesion which gives rise to these symptoms is due to some disorder of the pituitary body, it also must needs be temporary and transient.

It will obviously be of great help if any surgeon who comes across an active and recent case of Leber's disease, will get the sella Turcica examined with X-rays. The positive evidence which I have been fortunate enough to obtain may not be repeated in every active case; its absence would not prove that the pituitary body was not in a state of disorder—its presence is, to my mind, conclusive proof that something abnormal is in progress.

An opportunity for *post-mortem* examination at the appropriate moment should be eagerly sought.

At the present time I suggest that organo-therapy with thyroid and with pituitary extracts should be carefully experimented with in Leber's disease.

THE PROGNOSIS OF FOREIGN BODIES IN THE EYE AND ORBIT.*

BY

BERNARD CRIDLAND, D.O. (Oxon.),

WOLVERHAMPTON, ENGLAND.

IN approaching a subject such as prognosis, one naturally turns for information to the cases of which one has experience.

I have, therefore, reviewed the cases of foreign bodies in the eye and orbit which have occurred at the Wolverhampton Eye Infirmary during the past thirteen years, confining myself to those in which a foreign body has penetrated and remained in the globe or orbit, and not counting those in which a foreign body has merely lodged upon the cornea or conjunctiva; for this is what, I believe, was intended by the title under discussion.

The number of accident cases all told, but excluding military cases, which have attended in these thirteen years, is over 43,300, and the number of cases in which a foreign body has entered and remained in the globe, is

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* [illegible]

76, whilst only one case occurred in which a foreign body entered and remained in the orbit.

It has been a matter of astonishment to me that the number of such cases is so small. I quite expected there would have been several hundreds, for the district which the Wolverhampton Eye Infirmary serves is one in which the iron trade, in all its forms, is the chief industry, and the vast majority of accident cases which present themselves, comprise injuries to the eye by fragments of iron or steel lodging upon the cornea, or, if of any size, wounding the globe and causing more or less destruction thereby.

Inasmuch, then, as the percentage of foreign bodies remaining in the globe is as low as 0·17 per cent. in some 43,300 accident cases, the obvious comment is, that this class of injury is a rare one, at any rate, in the district of Wolverhampton.

In presenting details of these 77 cases, I will endeavour to avoid wearisome statements of figures, as far as possible.

Leaving out one case now under observation, and which, I fear, will end in enucleation, I find that, of the 76, *i.e.*, excluding the orbit case, 43 eyes were saved and 33 enucleated, the percentages being respectively 56·5 and 43·5 per cent.

The situations in the eye, occupied by the various fragments, with the number of cases in each, were as follows in order of frequency :—

	Cases.	Per cent.	Eyes saved.	Eyes lost.
Vitreous	36	48	12	24
Lens	12	15	10	2
Posterior scleral wall	11	14	4	7
Anterior chamber	11	14	10	1
Anterior scleral wall	3	4	2	1
Iris	1	1·3	1	—
Posterior chamber	1	1·3	1	—
Orbit (eye also injured) ...	1	1·3	1	—
	76	99	43	33

The nature of the fragment in the 77 cases was as follows :—

72 cases.—Steel or iron, the majority being steel.
4 ,, Pieces of glass, 2 eyes being enucleated.
1 ,, Thorn, eye saved.

The dominating factor in the prognosis as to whether the eye is to be saved or not, is, as might be expected, the occurrence, or otherwise, of sepsis. This may be early, causing panophthalmitis, or late, when the eye passes through the stages of severe irido-cyclitis, softens, and, finally, becomes a useless and painful organ. Added to this is the ever-present spectre of sympathetic ophthalmitis.

Regarding the cases in which the fragment was situated in the vitreous, in the 12 successful cases, the fragment was removed with the magnet, either through the original wound, or through a scleral incision, avoiding the ciliary region, and nearest to the site of the foreign body.

The resulting vision varied from 6/12 partly to P.L. Only one case had vision of 6/12 partly, one had vision 6/24, and the rest had 6/60 and less, chiefly less.

Of the 24 unsuccessful cases, all became septic sooner or later, although the magnet was successful in a good proportion in removing the foreign body.

Of the 12 cases in which the fragment was situated in the lens, the two in which the eye was enucleated had early became septic; of the 10 successful cases, the fragment had been allowed to remain in the lens until the cataract, which was forming, became mature—this took place at intervals varying from a few days up to a year in one case.

The resulting vision of these cases has been good, on the whole, and varying from 6/12 to 6/6 partly on correction; three cases, however, owing to subsequent inflammation, had much less than this.

Of the cases where the fragment had penetrated the globe and come to rest in the posterior scleral wall, four eyes were saved, and seven enucleated. The magnet was successful in removing the foreign body in one case only of the latter, but the eye was removed on account of subsequent inflammation; and of the remaining six enucleation was performed on account of sepsis, and as a preventive of sympathetic ophthalmia.

Three of the four "saved" eyes of this class are distinctly interesting, as they still contain the fragment, which, up to the present, has not caused any trouble, as far as can be judged. The patients have been warned of the risk they run, and present themselves for examination periodically. In one case only, of this class, was the fragment removed successfully by the magnet, and, unfortunately, I have no record of the vision resulting.

The cases where the foreign body lay in the anterior chamber call for little comment, for the fragment was easily removed, and in the one unsuccessful case, the eye was lost on account of sepsis, so also with those lying in the anterior scleral wall, the iris, and the posterior chamber.

The one case in which the foreign body lay in the orbit, was distinctly unusual, although by no means unique.—For ten days a piece of iron, $3\frac{5}{8}$ inches long by $\frac{1}{4}$ inch in triangular section, lay in the orbit on the outer side and penetrating through its outer wall with the posterior end lying beneath the skin, in front of the ear and the anterior end just behind the superior fornix in its outer part, but invisible from the front. On its way in, the piece had injured the globe, causing a prolapse of the iris, which was excised at once. There was considerable swelling in the temporal region, which was thought to be due to a blow from a blunt instrument at the same time, for the history given was simply that the man had had a sharp "smack" on the eye and side of the head. On the subsidence of the swelling, the end of the fragment could be felt, and the piece was withdrawn posteriorly through a small incision in the temporal region. He made a rapid recovery, and the eye has vision of 6/18.

From the above review of the cases, the conclusion is drawn that the vitreous is the place where a foreign body, having entered the eye, most usually comes to rest, and that the chances of the eye being saved in such an event are as one is to two.

The next most dangerous place is the posterior wall of the globe, the chances being a little less than "evens" that the eye is saved, although the occurrence of a foreign body in that situation is distinctly rare.

The best place of all is in the anterior portion of the eye, *i.e.*, the anterior or posterior chambers, the iris or the lens, and of these the lens is the worst; for, although, good visual results may be obtained, the patient is a one eyed individual as far as the labour market is concerned, although rather better than that by reason of possessing a potential eye, which would be of value, should anything happen to the good eye.

Treatment.

On the question of the treatment of these cases, and, indeed, of the above record of statistics, any remarks I make, must, I feel, be open to criticism, because the magnet at my disposal is that devised by Hirschberg. It is a powerful magnet, but by no means as powerful as the Haab, and much less so than the one recently devised by Rollet, of Lyons, which is the most potent one at present in use.

Although somewhat lacking in traction power, the Hirschberg, nevertheless, presents an advantage over the more fixed ones, in that it is easily handled and the points can be inserted into the globe at any angle, with the patient lying on the table.

Speaking generally as to the method of application of this magnet, with the exception of the cases in which the foreign bodies occurred in the anterior chamber and iris, it has always been necessary to introduce the point within the globe a greater or lesser distance, either through the original wound, enlarged if necessary, or through an opening in the sclera, avoiding the ciliary region, and in the closest proximity to the fragment or its suspected position as given by the skiagram, if it cannot be seen in the globe.

Attempts are always made to obtain that ideal result, when the fragment flies out through the original line of entry, by simply placing the patient's eye and the magnet in close proximity to each other, but I have never obtained this ideal, and I do not hesitate to introduce the point freely into the vitreous, if necessary, several times. It is, doubtless, a bold procedure, but I can point to successful results so obtained, even after having introduced the point six or seven times into the vitreous.

The alternative of leaving the fragment in the vitreous, is, in my experience, always disastrous. I do not recall a single successful case, among the civil ones at any rate.

The three I can record in which the fragment was imbedded in the posterior scleral wall, show that a foreign body may lie in that position, without the eye coming to harm ; there is nothing out of the way in this, for many other cases are doubtless recorded ; but as long as the fragment is there, risk of later trouble must always be present.

My one feeling, based on about fifteen years' observation of these cases, is that the fragment must be extracted at almost any cost, for if it is not, the eye is lost, making an exception, of course, of those cases where the fragment lies in the posterior scleral wall in an aseptic condition, or in the lens.

As I said above, however, I feel that my treatment and results are open to criticism, on the grounds that I work with a weak magnet, but these are the results obtained, and it will be a matter of great interest to me to compare the results obtained, in a not less number of cases, by the use of a big magnet, and to learn that it is so much superior to its little brother.

OPHTHALMOSCOPIC WORK IN A BRITISH BASE HOSPITAL.*

BY

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LAST summer the writer had the privilege of working with the Harvard Surgical Unit in the British Expeditionary Force, Base Hospital No. 22, in France, for three months, and during that time a great many interesting fundus changes were observed and watched from day to day and often seen several times a day.

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* A communication to the American Ophthalmological Society, May, 1916.

The Fundus in Trench Nephritis.

A good many soldiers are sent back from the trenches suffering from what has been termed "trench nephritis." There has been more or less controversy as to the cause of this affection, and at one time the urine in all of these cases was tested to see if it might be due to drinking water, poisoned with mercury bichloride. It has seemed to the writer that a satisfactory explanation is that this form of acute nephritis results from a lessening of the skin elimination, produced by standing for days and days in water-soaked clothing, and often up to the waist in water.

These men come into the hospital with a very marked general œdema, which in most cases is so extensive that pitting can be produced on the back of the fingers between the joints. The œdema is also especially marked in the face. The urine, which is scanty, is cloudy and at times slightly smoky. Examination shows a large amount of albumin, a few hyalin and granular casts, with some renal cells and occasional blood cells. The most remarkable feature of these cases was the extremely rapid subsidence of all symptoms soon after the men had been placed in a warm comfortable bed.

The British War Office requires the filling out and sending to the Boulogne station of a special blank, giving the results of urinary examination in all of these cases. This blank also requires that a fundus examination be made. In the earlier cases of "trench nephritis" that came to hospital—22, this fundus examination was not made until after the practical subsidence of the general œdema, and no changes were found.

It seemed, however, to the writer that there must be some disturbance of the optic nerve and retina where there was such a great amount of general œdema, and it was determined to make examinations as soon as the patients entered the wards. Accordingly, at 2 a.m. one morning, when six cases came into Ward A5, a fundus examination was made before the patients were put to bed, with the following results :

D. P.	Neuro-retinal œdema.
A. D.	Neuro-retinal œdema.
S. D.	Optic neuritis.
B. W.	Optic neuritis.
A. O.	Slight œdema of discs.
W. D.	Fundi normal.

The five cases showing fundus changes presented marked general œdema, with puffing of the face and eyelids. The sixth case had very little œdema, but the urinary examination was in keeping with the others.

These patients were all seen again after six-and-a-half hours rest in bed and profound slumber. All of them showed a marked decrease in the fundus changes.

Twelve hours later in the first two patients the fundi looked normal ; the next two showed a slight neuritis ; the fifth would ordinarily have passed for a normal fundus, the remains of the œdema being so slight ; while the sixth was still normal.

Another twelve hours later, after a full night's sleep, there was no sign of any fundus disturbance in any of these cases.

Subsequent cases of "trench nephritis" showed similar fundus changes, if seen immediately after admission. In no instance was there the slightest evidence of any degenerative processes, the whole picture being that of an acute nephritis of sudden onset and equally rapid recovery.

It will be interesting to note if in the future any of these cases of "trench nephritis" shows signs of impaired kidney function.

The Fundus in Brain Injuries.

As might be expected, practically all perforating brain injuries resulted in a more or less extensive meningitis, which was evidenced in the examination of the fundus by an optic neuritis, and where the cranial drainage was poor, the resulting increased cerebral pressure was evidenced by a " choking " of the disc.

Most of the cases of perforating and furrow skull injuries at the 22nd General Hospital, of course, came to operation for the removal of depressed inner plates and splinters of bone and the institution of suitable drainage. These cases had repeated fundus examinations, and at first the ophthalmoscope revealed nothing, but on succeeding days in all of the cases, which developed symptoms of meningitis, there was noted a beginning optic neuritis. Sometimes the optic neuritis would be discovered before marked meningeal symptoms had developed. Where there were evidences of increased cerebral pressure there appeared a rapid choking of the disc, which would subside as rapidly on the renewal of adequate drainage.

So clearly defined were these changes that the surgeons at the Hospital came to depend on the frequent reports of fundus examination for one of their guides as to the necessity for re-opening the cranial wounds for re-establishing the proper drainage.

The following cases are illustrative :

A. D. G. admitted on September 27th with a gunshot wound of the right side of the head, point of entrance being about an inch above the right eye, point of exit in the upper part of the right occipital region. Both wounds were the same size, having been made by a high velocity, sharp pointed, steel-jacketed bullet. A double trephining was done, drainage passed through the brain, and on the fifth day he developed an optic neuritis and other signs of pressure. The re-establishment of better drainage immediately lessened the amount of neuritis, but this had to be repeated several times before the optic neuritis finally subsided.

H. F., gun shot wound of right frontal region with prolapse of brain substance. On the fifth day after operation, there appeared a slight neuritis and signs of compression, which were quickly and permanently relieved by improving the drainage.

H. T., furrow wound of left parietal region of the skull with depressed inner table and exposure of the brain. This patient also developed an optic neuritis on the fifth day after operation, and in this case also there was immediate relief upon bettering the drainage.

H. G., gun-shot furrow wound on the left occipital region with depression of the inner table, causing a right homonymous hemianopsia. This case progressed favourably and without any development of optic neuritis.

P. H., W. A., and W. L., all had furrow wounds of the skull, with depression of the inner table, necessitating operative interference, but in none of these cases did any optic neuritis develop as a result of meningitis, or compression.

The foregoing cases all came into one ward from the same convoy. In other wards of the Hospital there were a number of similar cases where the fluctuation in the amount of optic neuritis and choking of the discs were looked upon as indications for, or against, renewed attempts to establish proper intra-cranial drainage.

NOTES OF SOME WAR WOUNDS OF THE EYE AND ORBIT.[*]

BY
J. F. CUNNINGHAM,
MAJOR, R.A.M.C.

Introduction.

THE following notes are taken from cases seen since April, 1915, *i.e.*, subsequent to the period covered by the paper read by Colonel W. T. Lister, before the Ophthalmological Society of the United Kingdom in April of that year.[†]

The majority of the cases cited were in beds at a Stationary Hospital, to which the Eye Department is attached.[‡] The remainder of the cases were in other hospitals in the district.

The large number of ophthalmic injuries in trench warfare are accounted for by the fact that the head is the part most frequently exposed. The injuries are in line with other war injuries in being more serious and more frequently complicated than those seen in civil practice.

Examination.

Although in some cases the condition of the eye is obvious at first sight, yet in others the exact condition is only ascertained after a thorough and methodical examination. Penetration of the globe by small foreign bodies is common. Yet any evidence of such perforation may be so slight that it is essential that a case of apparently simple superficial injury or concussion must not be accepted as such until all evidence of perforation has been carefully looked for and excluded. Small scabs on the lids, brow, cheek, or temple may hide the wound of entrance of a foreign body, which has passed through or lodged in the orbit or the eye.

Careful search must be made for small perforations in the sclera or cornea, holes in the iris, or opacities in the lens. The vitreous and retina are examined, and, finally, the X-rays and the Haab magnet are used to exclude as definitely as possible the presence of a foreign body. We have come across several cases in which the eye was intact anteriorly, but had been penetrated by a small fragment behind the reflection of the conjunctiva. It must also be borne in mind that a bullet or fragment of a shell entering at a distance, *e.g.*, through the ear or the other side of the head, may come to rest in the orbit without causing any external signs of orbital injury.

CASES

Foreign bodies of unusual nature.

The following three cases may be cited as instances of foreign bodies of an unusual nature.

CASE 1.—Pte. B., seen on February 20th, 1916, was wounded a few days previously by an unexploded German shell which burst while he and some others were examining it. His face was speckled, and there was a wound in the left eye, which was penetrated and disorganized. The right, and better, eye was, however, the one around which interest centered. Deeply embedded in the cornea, below and to the outer side of its centre, was a piece of bone, about the size of a millet seed, which had belonged to his neighbour, who was also wounded. It was removed with a Beer's knife. The fragment was deeply and very firmly embedded, and its removal was exceedingly difficult.

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[*] [illegible]

[†] [illegible] THE OPHTHALMOSCOPE, [illegible]

[‡] [illegible] theatre, fitted with a Haab magnet and also a hand magnet.

CASE 2.—Sergt. C. was admitted on January 4th, 1916. He had been injured by a cordite explosion a few days previously. There was a large septic wound of the right knee, and, in addition, he had a large number of small wounds all over the front of his chest. From these small blackened wounds particles of cordite could be expressed.

In the right eye there was a fragment of cordite embedded in the cornea. The lens and vitreous were clear in this eye, and the fundus was normal.

In the left eye there was a perforating wound of the cornea, a traumatic cataract, and an anterior synechia. The left vision was reduced to bare perception of light, and projection of light was faulty.

The piece of cordite in the right eye was almost in the anterior chamber. It was cut down on with a Beer's knife, and the small cylinder of cordite was removed with fine-toothed forceps. On February 1st, the right eye was quiet. The left eye was excised.

CASE 3.—Corporal P. was another gunner who had suffered in an explosion. In the right anterior chamber there were a number of small golden grains on the surface of the iris and lens capsule, and also some very minute grains on the back of the cornea. There was a small perforation at the limbus below, through which the foreign bodies had entered. The foreign bodies were believed to be tri-nitro-toluol.

Foreign bodies, magnetic and non-magnetic.

Foreign bodies in the eye may be magnetic or non-magnetic.

We have had to revise our initial views about many of the smaller foreign bodies met with in the eye, which we at first thought were generally non-magnetic. Certainly, this is the case with the majority of them. On the other hand, many of them are magnetic, although often not strongly so, and since we have had the use of a Haab magnet, we have had a number of cases where the foreign body has been successfully removed. The importance of having a Haab magnet at disposal cannot be over-estimated, for it enables us to do the best for the patient at the most favourable time. The fact that there are a large number of negative cases does not detract from the value of a definite number of successes. Even in cases that fail to respond to the magnet, it is satisfactory to the men and to their friends to know that everything possible has been tried in these serious injuries. Still more is this so when both eyes have been injured. The small foreign bodies in the eye may be derived from practically every form of missile; they very frequently occur after the explosion of one of the various forms of grenades or high explosive shells, or the fragment may be derived from a bullet if it strikes a hard object in the vicinity, *e.g.*, the parapet, rifle, etc.

Intra-ocular foreign bodies fall into two classes according to their position:

(i) Those in the anterior chamber or in the lens, where they can be seen on external examination.

(ii) Those that are further back, and are either invisible or seen only with the ophthalmoscope.

When the foreign body is lying on the surface of the iris and there is no injury of the lens, the outlook is very satisfactory. We have had seven of such cases.

In one there was a minute piece of copper, which was only just visible to the naked eye, and which was removed from the iris with fine forceps. In another there was a small magnetic foreign body, which was removed from the surface of the iris with the hand magnet. In another case the foreign body was very friable and several small pieces had to be removed ; they were all lying on or in the iris. Only in one instance was a small iridectomy necessary, owing to the entanglement of a scale of the foreign body in the iris.

When the lens has been injured, the outlook is, of course, much more serious. The eye may be lost from suppuration or chronic inflammation ; in other instances the foreign body may become firmly fixed in the lens (see Case 6); or, again, the lens may soften and may be washed out, as in the following case.

CASE 4.—Sergeant S., was seen on September 30th, 1915. Three days previously, he was wounded by a splinter from a bullet which hit a wall near him. There was a linear scar in the right cornea, just above and to the temporal side of its centre. A small foreign body was seen lying in the lens, below and a little to the nasal side of the centre of the cornea. Vision was reduced to perception of light, but projection was accurate. The eye was cocainised, and a keratome section was made in the cornea above, and the terminal of a small magnet was introduced, but the foreign body was found to be non-magnetic ; so it was then removed with fine toothed forceps, and the lens matter was washed out with normal saline solution. On October 6th, the right pupil was circular and black, and the eye was practically quiet.

Of the foreign bodies in the posterior part of the eye, it is only those that are magnetic that can be removed. The following case is an instance of this :—

CASE 5.—Private R., wounded on January 2nd, 1916. He said a bullet hit the loop hole, and he was struck by a splinter in the left eye. He had the ordinary signs of perforation, and there was a "Vossius ring" in the lens. There was a hæmorrhagic and somewhat œdematous looking area below the macula, and further down, a glistening foreign body could be seen in the vitreous. The foreign body was brought forward with the Haab magnet, and removed with the small magnet through a keratome incision. In this case a small iridectomy was necessitated owing to injury of the iris by the foreign body.

The patient had an urticarial eruption the day after the operation, followed by an attack of pneumonia, but this did not interfere with an uninterrupted recovery of the eye.

The foreign body may be only slightly magnetic, *e.g.*, when it happens to be part of the mantle of a German rifle bullet, which is made of ferro-nickel. On the other hand, a foreign body may be so firmly fixed in the sclera that it cannot be removed. The following cases illustrate these points :

CASE 6.—Captain U. was injured by a bomb explosion on September 5th, 1915. In addition to his other wounds, the condition of the left eye was as follows.—There was a small corneal nebula, a hole in the lower part of the iris, and a track in the lens leading to a foreign body, which was embedded in its substance. The foreign body and the small particle itself could be seen in the lens. When put up to the Haab magnet, the lens as a whole came forward slightly, but the foreign body was not dislodged from it.

CASE 7 was that of a man brought over from another base for trial with the magnet. With the ophthalmoscope, a foreign body could be seen in the lower part of the fundus. It lay transversely, and had a length of rather more than the diameter of the optic disc. When brought before the Haab magnet, there was apparently no response, the patient felt nothing and no movement of the eye could be detected : and had the examination ceased here we should have thought the foreign body was non-magnetic. However, on looking at the foreign body with the ophthalmoscope by the indirect method, at the same time as the magnet was being used, we could see, when the current was completed, that the eye was definitely twisted, showing that the foreign body was really magnetic, although it was too firmly fixed in the sclera to allow of its removal.

Risk of foreign bodies in the eye.

It is not proposed to consider here the various dangers that may arise from a foreign body when retained in an eye. I should like, however, to emphasize the fact that, as in civil practice, we see eyes from time to time which, although containing a foreign body, yet retain a useful amount of sight, and remain quiet and apparently harmless.

Where there is no uveal prolapse or entanglement of lens capsule, or if there has been a prolapse it has been completely removed, there is no risk in leaving eyes with foreign bodies in them, provided that they quiet down. If the inflammation does not subside, or the eye is blind, no risk should be run. A too hasty decision as to the uselessness of an eye must, however, be avoided. We have met with several instances of an eye being so badly concussed that it had no perception of light, but a few days later, it had recovered sufficiently to count fingers.

The next case is an instance of a foreign body projecting into the eye posteriorly, and yet in the course of over a year, there have been no signs of degeneration or progressive deterioration of vision:

CASE 8.—Major C. was wounded on November 7th, 1914, by a shell which burst in front of him, when he felt something hit the left eye. He went to England, and was first seen here in March, 1915, on his return to duty. He was anxious to know if the injury to the left eye might in any way affect the right eye.

R.V.=6/6. L.V.=6/60 +2·0 D. sph.=6/36.

There was a slight convergence of the left eye, which had been operated on for squint when he was seven years old. There was no proptosis, no pain on moving the eye, and no limitation of movement With the ophthalmoscope, there was some opacity and haziness of the vitreous, and a large white triangular area of scarring and atrophy in the retina and choroid below, about midway between the macula and the visible periphery. Just below the macula there was a hole in the retina, through which projected what looked like a minute black linear splinter. The upper half of the field was defective, corresponding to the white atrophic area below.

An X-ray localization was made by Capt. Curtis Webb, who found that there was a foreign body, 13 mm. long, mainly in the orbital tissues at the back of the globe, the upper end of which was projecting into the eye, thus accounting for what was seen with the ophthalmoscope. This officer was examined at regular intervals, and he was last seen on December 11th, 1915. The eye was then perfectly quiet, and the vision and field were the same as they were in March, 1915.

Intra-ocular foreign body associated with uveal prolapse.

When there is a foreign body in the eye which cannot be removed, complicated by a prolapse of uveal tissue, and it is decided to see if the eye will quiet down and retain useful sight, it is, of course, extremely important to get rid of the prolapse by drawing out and excising in the case of the iris, or in the case of the ciliary body replacing or excising as seems best, combined with careful suture of the sclerotic. This gives the eye a chance of quieting down with the minimal risk, and if it does so, it allows of any subsequent operation that may be deemed necessary to improve vision.

If the sclera is not sutured, it is liable to be followed by a prolapse of the ciliary body at that critical time when the fate of the eye hangs in the balance.

The following case is one in which a uveal prolapse disappeared spontaneously:

CASE 9.—Pte. C. had a penetrating wound at the limbus, partly corneal, partly scleral, but without prolapse on admission. Prolapse gradually developed in about eight days' time, and it became a very difficult matter to decide what line of treatment should be adopted. About two weeks later, however, the uveal swelling disappeared spontaneously.

In some cases a defect in the cornea has been covered over with a conjunctival flap after an iridectomy, as in the following case:

CASE 10.—Sergt. R. admitted on May 22nd, 1915. He was wounded by a bullet at a range of 200 yards. The entrance wound was over the inner canthus on the left side. The bullet could be felt fairly superficially in the neck on the opposite side. The right eye was normal except for a conjunctival ecchymosis below. The entrance wound was about half-inch across, and there was a defect in the left cornea. The gap in the cornea was about 2 mm.-3 mm. in diameter, and through it there was a prolapse of the iris; the lens was opaque. L.V. = hand movements. An anæsthetic was given, the prolapse was excised, and the pillars of the iris were replaced. Conjunctival flaps were cut to cover the defect in the cornea, and they were brought together with sutures. The eye quieted down, and after the removal of the stitches, the patient was sent to England.

Large foreign bodies in conjunctival sac.

The next two cases of foreign bodies in the fornices are remarkable for the size of the foreign bodies which had entered the conjunctival sac without perforating the lid.

CASE 11.—Rifleman B., seen on the 26th April, 1915, gave the history of having been wounded by a bullet three days previously. On examination, there was marked striate keratitis and general haze of the cornea. A hard globular swelling could be felt through the left lower lid. The movements of the globe were limited downwards, and, to a less extent, upwards. L.E. T.—2. There was no external wound of the lower lid, but on drawing it away from the globe, a smooth metallic surface came into view, lying in apposition with the globe, below and to the outer side. The eye was cocainised, and, much to the patient's surprise, a German shrapnel ball was removed from the fornix. The sclera looked dark where it had been in contact with the shrapnel bullet, but there was no perforation, and the staining cleared up in the course of a few days.

On May 1st, the eye was quieter, and the corneal haze considerably less. On May 5th, when the clearing of the haze rendered an ophthalmoscopic examination possible, a large web of vitreous opacity was seen, and the outlines of the optic disc and vessels could be made out indefinitely.

The shrapnel ball in falling must have forced its way between the lid and the sclera into the fornix. The intra-ocular hæmorrhage would allay any suspicion that the shrapnel ball had been inserted within the lid intentionally.

This remarkable case illustrates another point of very frequent occurrence, *viz.*: that the tension may be greatly reduced in severely concussed eyes without actual perforation.

A somewhat similar condition was seen after the engagement in September, 1915:—

CASE 12.—A man who had several shell wounds, complained of pain in the left eye. There was some tenderness over the inner part of the left upper lid, and on gently drawing the lid away from the globe, a piece of shell was seen, about 1 cm. in length by about ½ cm. in the other two diameters. Cocaine was instilled, and it was removed; it had wounded but not perforated the sclera. There was no external wound of the lid.

Ruptured globe.

In the case of shell or bullet wounds, if the eye is hit by a large fragment, it is generally ruptured out of all outward recognition. On the other hand, as said before, we have come across several cases in which the eye was intact anteriorly, but had been penetrated by a small fragment behind the reflection of the conjunctiva. Small fragments retained in the eye frequently give rise to panophthalmitis.

Unusual foreign bodies may be driven into the eye by the bursting of a shell, as instanced by the following case of an officer seen early in April, 1915:—

CASE 13.—Lieut. R. A shell exploded in his "dug out"; the last thing he remembered was that he was "enjoying himself cooking potatoes." There was a large wound of the skull in the frontal region which had carried away most of the anterior wall of the left frontal sinus and involved the left orbit; the left globe was disorganized.

There was so much swelling of the lids, orbital tissues, and conjunctiva that a complete examination was impossible at first, but two or three days after admission, when his condition had improved and some of the swelling had subsided, it was recognised that there was some foreign body in the place of the globe. Under an anæsthetic, two pieces of wood, which had formed parts of the beams of his "dug-out," were removed from the middle of the left orbit. The larger piece measured 3·5 cm. by 1 cm. by 0·75 cm., and the other piece, although a good deal finer, was nearly as long. What remained of the eye was removed at the same time, leaving a small scleral frill round the optic nerve.

We have found the "scleral frill operation" most useful in these cases when the sclera is split into ribbons, and when wounds of the eye are complicated, as they so frequently are, with orbital cellulitis or panophthalmitis. The majority of our excisions here are done by this method, and in no case has excision been followed by septic meningitis. An X-ray photograph should be taken prior to excision in all these cases of ruptured globe, for although the remains of the globe call, without doubt, for removal, the skiagraph may reveal a foreign body in the orbit which may be removed at the time of excision, and which might otherwise have been overlooked.

Foreign bodies in the orbit.

Foreign bodies in the orbit are tolerated extremely well, provided there is no orbital cellulitis due to infection.

In the absence of such inflammation, in our opinion, the foreign body should be left alone. Hot fomentations bring about the subsidence of the initial swelling, while if the foreign body is sought for, a grave amount of proptosis may occur and lead to ulceration of the cornea and loss of the eye.

Should orbital cellulitis appear, however, it must be treated in the usual way, and the foreign body removed. A Volkmann's spoon or similar instrument which is held in contact with the Haab magnet may be passed into the wound of entrance, and sometimes enables a magnetic foreign body to be withdrawn with the least damage to the orbital tissues.

Case 8, already quoted, is an instance of a foreign body partly in the globe, and partly in the orbit, which caused no irritation.

CASE 14.—Pte. W., seen in March, 1916, also illustrates this point.—A piece of shell, about half an inch square and one-eighth of an inch thick, had entered the right ear and was lodged in the upper and outer part of the right orbit. There were no signs of orbital cellulitis or any external indications that the orbit had been injured. Marked concussion changes in the right fundus were seen with the ophthalmoscope, and the eye was quite blind. The man subsequently died of cerebral abscess and meningitis. At the *post mortem* examination the foreign body was found lying in the upper and outer part of the orbit, there were no signs of surrounding inflammation, and the optic nerve was not divided.

Neuropathic ulceration of the cornea.

Another point of interest which, so far as I know, has not yet been mentioned, is that in cases where a missile has passed through the orbit, causing severe concussion to the orbital tissues, the cornea may lose its sensation and be attacked by neuropathic ulceration, probably due to interference with the ciliary nerves.

How persistent this condition may be we do not know. In one case the ulcer healed rapidly without it being necessary to suture the lids, and the sensation of the cornea returned. In the following case, however, it persisted certainly for nearly two months, after which the patient was sent to England:

CASE 15.—Capt. A., seen on July 14th, 1915. He had been wounded by a shell eight days previously while sniping from a chimney. There was a wound about the middle of the right lower lid and chemosis of the conjunctiva below. He had numerous wounds all over the body which will be described later.

As far as the eyes were concerned, the outstanding feature was that with a single external wound in the right lower lid, he could see only hand movements with the right eye, while the left eye was completely blind. He was so dangerously ill that an X-ray photograph could not be taken for some days. The ophthalmoscope revealed severe concussion changes (hæmorrhages and gross white areas) in the right, and, to our surprise, also in the left eye. These changes pointed to the fact that a foreign body must have traversed both orbits. This was substantiated later when he was well enough to be X-rayed: a foreign body, about 1 cm. square, was then revealed far back in the left orbit. It was also found as his general condition improved, and further observations could be made, that he had lost his sense of smell. The foreign body must have entered through the right lower lid, passed across the nose, and come to rest behind the left eye. It is interesting to note that apart from a slight subconjunctival hæmorrhage on the left side, there was no outward sign of injury to this orbit: there was no proptosis, limitation of movement, or other sign of orbital cellulitis (C.F. cases 8 and 14). After ten days, during which time his condition had been very critical and life had been despaired of on three occasions, he developed a corneal ulcer in the right eye, the sensation of the cornea was nearly abolished and the ulcer was in all respects of the neuropathic type. Protection by bandaging failed to stay the ulceration, and the lids had to be sutured in their outer two-thirds; this arrested the ulcerative process.

To instance the serious nature of this case from a general point of view I give a catalogue of his other injuries.—He had three wounds on the front and two wounds on the right side of the chest, two wounds of the right arm, two wounds of the left leg, and laceration of both hands. Besides this, there were a large number of minute wounds, particularly over the right shoulder and arm and in both legs. The chest wounds were the most serious. He had an empyema on the right side, which required a resection of rib, and a foreign body in the liver, followed by a subphrenic abscess. In spite of all these injuries, he made a remarkable recovery.

Bullet wounds.

In the case of bullets passing through the orbit the eye may be completely disorganised, with the contents extruded from the sclerotic. The globe is often ruptured by *contre-coup*, and we have frequently found the entire cornea turned down in the form of a flap as the result of a bullet having passed through the posterior part of the orbit. The eye may occasionally be dislocated forwards. A similar injury may give rise to dislocation of the eye forwards, as in the following instance:

CASE 16 is that of a man who was wounded in the attack of September 25th to 27th. A bullet had passed transversely through the temples. Both eyes were dislocated forward, so that the major part of each globe was outside the palpebral fissure. Both corneæ were dry and ulcerating. He was quite blind, and in a great deal of pain, and it was therefore decided to remove the eyes. It was unnecessary to divide either optic nerve, for both had been severed by the bullet, so that on division of the muscles, both eyes came away at once. In one eye the optic nerve was divided just behind the globe, which was severely ruptured; in the other, an inch of the nerve remained attached to the globe, showing that it must have been divided far back in the orbit.

The last case is one in which a bullet passed through both orbits:

CASE 17.—Lieut. G., wounded in May, 1915. The bullet had entered from behind, at a point above and in front of the right ear, and divided the right optic nerve, or fractured the sphenoid in the neighbourhood of the optic foramen, and passed out through the left orbit. The left eye was disorganised. The right eye was proptosed, and although there was a good red reflex, a satisfactory view of the fundus could not be obtained, owing to haze of the media. There was no perception of light in the eye. The remains of the left eye were excised.

We heard that this officer had subsequently to have his right lids sutured in England on account of the condition of the cornea. In this case, also, there was neuropathic ulceration of the cornea due to division, or possibly concussion, of the ciliary nerves in the orbit.

I must apologise for the fragmentary nature of these remarks, but the conditions were not always favourable for extensive note-taking. I bring them forward mainly for the purpose of illustrating some of the types of cases with which we have had to deal.

CLINICAL MEMORANDA.

QUININE AMBLYOPIA.

BY

H. KIRKPATRICK,

MAJOR I.M.S.,
MADRAS, SOUTH INDIA.

In view of the comparative rarity of poisoning by massive doses of quinine, the notes on the following case may be of some interest :

The patient was a West coast Indian lady, aged 30 years, who stated that eleven months previously she swallowed about half an ounce of quinine sulphate in mistake for Epsom salts. She is said to have lost consciousness shortly after, and to have remained in that condition for three hours. She did not fully come round till fifteen hours had elapsed, and was then found to be completely blind and almost completely deaf. Her hearing was recovered after three days, and her sight gradually improved until at the end of three months she was able to read small type but was still blind at night.

Seven months after the quinine was taken, her sight began to fail again, and when seen in consultation in September, 1913 (four months after the secondary failure had commenced) the vision in each eye was reduced to light perception.

On examination, the right pupil was semi-dilated and reacted very sluggishly, and the left pupil was dilated and inactive. Both nerve heads were very white, the left being especially so. Atrophic cupping was not apparent. The superior nasal artery of the left eye was much thickened and almost obliterated, whilst overlying it, as it crossed the nerve edge, was seen a mass of hyaline, shaped like a cumulus cloud, and about one-twelfth the disc in size. Similar changes were seen in the right eye, but here it was the inferior nasal artery that was affected and the hyaline was not quite so large. Beyond the retinal vessels appearing somewhat unduly small, no other abnormality was observed.

She was advised to have intramuscular injections of strychnine with cyanide of mercury, to use inhalations of amyl nitrite, and to induce hyperæmia by means of a Bier's suction glass.

I heard nothing more of the case until April, 1916, when her daughter, aged 15 years, consulted me for an attack of retrobulbar neuritis. I was then informed that the treatment had been carried out for about three months without any great benefit, but that the vision had since considerably improved and the patient was now able to walk about freely by herself and able even to read large type.

RECURRENCE OF ORBITAL SARCOMA SUCCESSFULLY TREATED BY RADIUM.*

BY

N. S. FINZI, M.B.Lond.,

LONDON, ENGLAND.

S., female, aged 63 years.

About four years ago the right eyelid was noticed to be drooping; later, the eye became prominent. A growth was removed from the orbit by Mr.

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* [illegible]

Charles Wray in May, 1913. A section from this was reported to be in the nature of endothelioma.

A recurrence took place, and in September, 1914, the growth was again removed; three weeks later, the eye was removed, and in November, 1914, some further growth was removed from the orbit. The tumour recurred in April, 1915, and radium treatment was commenced in September, 1915, 150 milligrams of radium bromide being used through a filter of 2 mm. of platinum. Subsequent applications were made on 15th November, 1915, and 17th January, 1916, 200 milligrams of radium bromide being used and similar filters.

In September, 1915, there were two large rounded growths filling up the upper part of the orbit, and there was also an ulcerating growth in what was left of the conjunctiva.

There is at the present time no sign of any of the growth, but it is intended to give a further prophylactic application of radium.

PARALYSIS OF THE SYMPATHETIC (BIRTH INJURY), WITH SLIGHT HETEROCHROMIA IRIDIS.*

BY

M. S. MAYOU, F.R.C.S.,

LONDON, ENGLAND.

E. N., aged 8 years, male. Admitted to Paddington Green Children's Hospital on February 23rd, 1911.

The child had been delivered by forceps with great difficulty. It was noticed, not long after birth, that there was a slight droop in the right eyelid. The right pupil was smaller than the left, but reacted to light.

At the present time the right iris is more bluish in colour as compared with the left, which contains rather more brown pigment. The right pupil does not dilate so fully as the left, and is not dilated by cocaine, whereas the left dilates fully. There seems to be some diminution of lacrymal secretion, and sweating on the right side of the head, together with a slight enophthalmos. The fundi are normal, and there is no difference in pigmentation on the two sides. Vision 6/6 in both eyes.

Remarks.

This is the third case of its kind which has come under my care.† They have, all of them, followed prolonged labour with the use of instruments. The alteration in the colour of the iris is probably due to the fact that the paralysis had taken place in very early life, before the development of the pigment in the stroma of the iris which takes place soon after birth. The fact that there is no alteration in the retinal pigment further points to the condition being due to a failure in the development of the pigment in the iris stroma. In the cases previously published the heterochromia was of a much more marked character, owing to the normal iris being brown in colour.

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*Case shown at the Ophthalmological Society of the United Kingdom, May 5th, 1916.

†*Trans. Ophthal. Soc. U.K.*, 1910, Vol. XXX, p. 196.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—QUININE AMAUROSIS.

(1) **Terrien and Aubineau.**—Quinine amaurosis. (Amaurose quinique.) *Archives d'Ophtalmologie*, novembre, 1913.

(2) **Porte, Georges.**—A case of quinine amaurosis. (Un cas d'amaurose quinique.) *Revue Médicale de la Suisse Romande*, 20 mars, 1916.

(3) **Shahan, W. E.**—A case of quinine amblyopia. *American Journal of Ophthalmology*, May, 1916.

(1) **Terrien** and **Aubineau** record a case of quinine amaurosis in a woman, aged 46 years, who had always enjoyed good health previously.

A dose of 7·5 grammes of quinine sulphate was taken in some patent emmenagogue *cachets* at a menstrual epoch.

After a period of complete blindness and deafness, some vision was recovered in both eyes, but almost completely lost later. Considerable contraction of the visual fields for white was present, with abolition of colour sense, and also post-neuritic atrophy with sclerosis of retinal arteries.

In view of the opinion held by Druault, to the effect that the toxin acts directly upon the nerve cells of the retina, and not through the intermediary of the vessels, an interesting point in the case arises, namely, that the eye which suffered most (right) was the one in which the changes in the retinal vessels were most marked, and in this eye also pupillary reactions were abolished from the first and never recovered. The left pupil was also fixed in dilatation, but reaction reappeared in a month. The authors further draw attention to the fact that of the published cases, the most serious were those in which the retinal vascular changes were most marked, and, further, that in those very rare cases in which the vessels appeared normal, notwithstanding a diminution in vision, no histological examination had been made of the smaller vessels. The fact that the quinine in this case was taken at a menstrual period is also referred to, with the possibility that on that account there may have been a greater vascular reaction, a point also brought out in a similar case published by Grüning. BERNARD CRIDLAND.

(2) The case of quinine amaurosis reported by **Porte** is peculiar in two respects. In the first place, the symptoms followed the ingestion of a moderate dose of quinine sulphate, and, secondly, the patient made a complete recovery.

The facts follow:—

An anæmic woman, aged 23 years, took one gramme of quinine upon October 7th, and upon October 9th two more grammes of the remedy. On the last-named date, after the second dose of the medicament, she experienced headache and complained of buzzing in the ears. Shortly after the third dose, the patient became deaf. Her hands trembled a little. When she went to bed at 11.30 p.m. she could not see clearly, a symptom to which she attached but little importance at the moment. A medical man, who was summoned shortly afterwards, found, however, that sight was completely lost.

When examined by Porte, on the morning of October 10th, the patient was pale, extremely depressed, and called upon death to relieve her from her misfortunes. The pupils were fully dilated and motionless. No perception of light. Marked pallor of the optic discs, retina, and choroid. The retinal vessels were much contracted and altogether invisible in the peripheral parts of the fundi. The fovea centralis stood out as a small rounded red spot, similar to that seen in embolism of the central artery of the retina. A soft systolic murmur, thought to be hæmic, was present and most marked at the apex of the heart.

Treatment included rest in bed in a darkened room, purgatives, and diaphoretics, together with milk diet and a decoction of herbs (*tisane*). Locally, half a centimetre of sodium chloride with a little dionine added was injected beneath the conjunctiva. On the same evening the patient could occasionally perceive the light of the lamp. Next day (October 11th) the pupils were dilated and immobile. The retina was of a more normal colour, and the red spot at the fovea was less pronounced. Vision = 0·6, but the field of vision did not extend further than the 10 degrees from the fixation point. Colours were recognised at the fixation spot. On trying to get up, the patient suffered from giddiness and groped like a blind person. Trinitrine was prescribed. On the following day (October 12th), the patient was able to read a post-card that she had received. On October 14th the pupils were noticed to react to light, and on the following day, the visual fields extended from 25 degrees to 30 degrees from the fixation point. A couple of days later (October 17th), the patient was able to guide herself during the day, but at night showed signs of hemeralopia. On October 25th, central and peripheral vision, both for white and for colours, were normal. When seen eighty days after this last note, nothing was found amiss with the eyes, excepting a slight contraction of the retinal arteries. The cardiac murmur had disappeared. SYDNEY STEPHENSON.

(3) A woman, aged 28 years, had been given 1 oz. of quinine and an equal amount of ergot, in divided doses, during six hours of labour. On the following day the patient was found to be blind and deaf.

Seen by **Shahan**, of St. Louis, eighteen days after the quinine had been given, the patient's pupils were elliptical in outline, but responded promptly to light. V.= perception of light over the centre of the field. Retinal vessels very small, especially the arteries, which appeared as fine silvery threads over the surface of the optic disc. The patient was treated by inhalations of amyl nitrite. Six weeks later her sight was R.E. 20/15. L.E. 20/60. Discs pale. Retinal vessels small. Total blue-green blindness. The condition noted some nine months after she was first seen, was R V. 20/15. L.V. 20/38. Patient unable to read ordinary print. Fields much contracted.

SYDNEY STEPHENSON.

II.—AMYLOID DISEASE.

(1) **Coats, George.—Hyperplasia, with colloid and amyloid degeneration of the episcleral and circumdural fibrous tissue.** *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 257.

(2) **Bedell, Arthur J.—Report of a case of colloid degeneration of the upper lid.** *Trans. Amer. Ophth. Society*, Vol. XIV, Part i, 1915, p. 313.

(1) This communication by the late **George Coats**, of London, is devoted to the description, clinical and pathological, of a curious condition, which began

in a male patient at the age of twenty-five, and pursued a very slow progress during a period of upwards of seventeen years, at the end of which time the eye was removed, together with some of the contents of the orbit.

To enter a little more into detail, it may be stated that the condition began, without known cause, in the conjunctival or subconjunctival tissues of the left eye, and remained limited to that eye throughout The appearance when first seen was that of "solid œdema" of the ocular conjunctiva, together with a ring of similar appearance, one-eighth of an inch thick, surrounding the cornea. Proptosis, but the ocular movements unimpaired. Deep cupping of the optic disc. Pulsation of the retinal arteries. Vision (corrected) 6/12. T.? The thyroid was symmetrically enlarged, but there were no manifestations of hyper- or hypothyroidism. In the course of the disease the eyeball became surrounded by enormous indurated nodular masses, and its movements were much impeded. Vision gradually sank to 2½/60. The diagnosis was made of "Gummatous Infiltration of the Capsule of Tenon" there was a somewhat doubtful history of a syphilitic infection when the patient was eighteen years of age). Treatment by mercury, carried to the length of salivation, and by occasional scrapings and partial excisions proved useless. Finally, the orbit was partially exenterated.

To the naked eye, after removal, considerable masses of a hard consistence, the cut surfaces of which had a granular or nodular aspect, were seen to be attached to the anterior and the posterior portions of the affected eyeball. The dural sheath was greatly thickened, and surrounded by dense masses of the growth. The optic nerve was apparently not invaded. Recti muscles hypertrophied but not infiltrated.

Microscopically, the dural sheath had become thickened three- or four-fold, due to the presence of degenerate areas, of somewhat irregular distribution. These were intermixed with, and occurred as islands among, the more normal wavy fibrous tissue. Some of the smaller arteries showed a similar change, the media being especially affected. Beyond proliferation here and there, the endothelium of the vessels showed no other changes. When special methods of staining for amyloid degeneration were employed, many of the bundles, although converted into homogeneous cylinders with flattened endothelial cells applied to their outer surface, failed to manifest the distinctive reaction; others showed it in an atypical form; and the reaction was unequivocal only in the most degenerate areas and the large masses of homogeneous substance. Giant cells of the so-called "foreign body type"—*i e.*, with nuclei grouped towards the centre of the cells—were common. The dense tissues of the hypertrophied dura were free from inflammatory infiltration. The looser tissues outside the dura were in places free or showed merely a few plasma and other chronic inflammatory cells. More commonly, the interspaces between the fibrous trabeculæ were occupied by a moderately dense infiltration of lymphocytes.

In the anterior part of the eyeball the changes, degenerative and inflammatory, were on a much coarser scale. Almost all the fibrous trabeculæ of the subconjunctival and episcleral tissues were transformed into swollen shapeless lumps, of homogeneous aspect, with but a few degenerate nuclei lying here and there in clefts throughout their substance. Patches of calcification were not uncommon, and many of the larger masses had flattened scales of bone applied to their external surfaces. The sclera showed scarcely any change, and that was limited to some of the superficial fibres in its most external layers. Lymphocytal infiltration filled the inter-trabecular spaces of the episcleral tissues, and had penetrated along the perforating vessels into the interior of the eyeball, where it had involved the whole of the uveal tract. The iris, however, was comparatively little affected The ciliary muscle had undergone amyloid degeneration, and some of the fibrous bands crossing between sclera and ciliary body showed the same change. The intra-ocular infiltration formed a uniform layer, with no tendency to the formation of nodules or tumour masses.

The retina showed some atrophy of its nerve fibre layer, and the optic nerve was partially atrophic. There was no true glaucomatous cupping, inasmuch as the lamina cribrosa was not bowed backwards. The central vessels were free from amyloid degeneration or other pathological change. No corpora arenacea or amyloid bodies were noted in the optic nerve or its sheath.

In commenting upon the foregoing case, Coats states that the degenerative changes were clearly secondary to a very slowly progressive overgrowth of the fibrous tissue immediately surrounding the globe and dural sheath of the nerve. The fact that proptosis was an early sign leads him to surmise that there was an independent and nearly contemporaneous involvement of the fibrous tissue of the dural sheath and of the episclera. It is probable, he thinks, that the intra-ocular tension was never really raised. The cup was not a true glaucomatous excavation. He excludes syphilis and the enlarged thyroid gland as being concerned in the causation of the condition. By quotations from the works of Leber and Kubli respectively, he proves that the condition in his case was most nearly related to "amyloid degeneration of the conjunctiva." In his view, indeed, there can be no doubt that the two conditions were one and the same. Coats's case, however, is unique in regard to the distribution of the changes.

At the same time the author offers an alternative explanation of the case, namely, that the condition was essentially a lymphatic new growth, whether inflammatory hyperplasia or true lymphoma, the colloid* and amyloid change being merely secondary. The pathological evidence, however, is against such a view. The lymphocytal infiltration was greatest in front, precisely where an inflammatory reaction might be looked for, owing to exposure of the growth in the palpebral fissure. SYDNEY STEPHENSON.

(2) The patient whose case is reported by **Bedell**, of Albany, N.Y., was a strong and vigorous lumber inspector, aged 48 years, whose left upper eyelid had been noticed to droop for at least two years, the assigned cause being some sawdust believed to have gotten into the eye in the course of his occupation. As shown in Figure 1, there was complete ptosis, and the matter was the more serious since the sight of the other eye was practically useless owing to a dense opacity of the cornea, probably the result of ophthalmia neonatorum. On eversion of the left upper eyelid, the appearance illustrated in Figure 2 came into view. The growth measured 35 mm. by 25 mm. by 12 mm. Its anterior portion (25 mm. by 8 mm.) was very rough and covered with large granulations of a dark-red colour, suggesting one form of conjunctival tuberculosis. Under general anæsthesia, the mass was dissected out, an operation that offered no particular difficulty. Little reaction. Result good.

The results of the pathological examination (made by Ellis Kellert) were briefly as follows.—The epithelium of the conjunctiva was atrophic and in places absent. The specimens consisted almost entirely of structureless masses, varying greatly in size, small towards the surface, and becoming larger and conglomerate towards the centre of the tumour. There were

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*Following the example set by H. Herbert (*Trans. Ophth. Society U.K.*, Vol. XXII, 1902, p. 261), Coats uses the word "colloid" in a purely descriptive and not in a chemically specific sense.

deposits of calcareous material in the homogeneous masses beneath the epithelium. Cellular elements were scattered through the specimens, and an occasional focal accumulation of lymphocytes containing a giant cell were to be seen. The blood-vessels showed amyloid changes, and so completely was their structure altered that they could be recognised as blood-vessels in many cases only by their shape and their contained erythrocytes. The appearance of some of the vessels led Kellert to surmise that the amyloid changes had commenced in the adventitia and the outer layers of the media. The Meibomian glands manifested amyloid changes. As regards the staining reaction of the homogeneous masses, the best results were obtained from the Bismarck-brown-methyl-violet method of Birch-Hirschfeld, methyl violet, and Lugol's solution of iodine and 5 per cent. sulphuric acid.

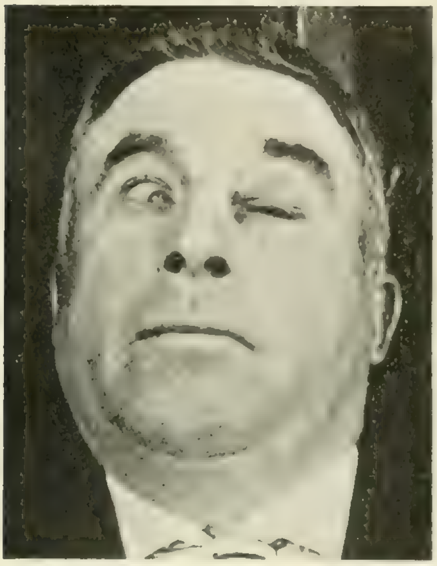


Fig. 1.—Before operation. Showing the extreme ptosis of the left upper eyelid and small palpebral fissure. The right eye is turning, with the dense leukoma.

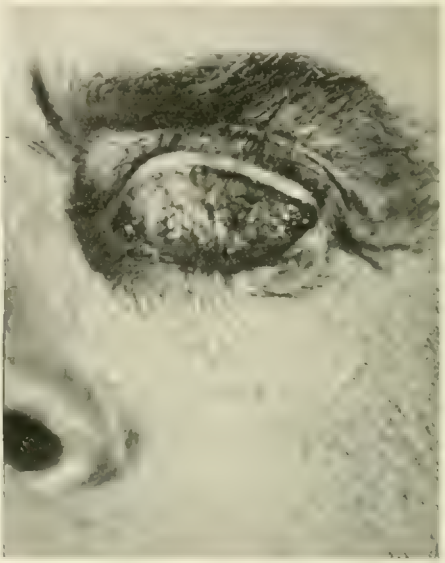


Fig. 2.—Eversion of the upper lid, showing the size of the growth.

A good bibliography is appended. It includes two American references (Bull and Prout) and one English (H. Herbert). SYDNEY STEPHENSON.

III.—TUBERCULOUS AFFECTIONS OF THE EYE.

(1) Kohn, K. Tubercle of the iris and optic nerve sheath in the ox (Tuberkulose der Iris und der Sehnervenscheiden beim Rinde). *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

(2) Luedde, W. H. Ocular tuberculosis of nasal origin. *Transactions [illegible] Ophthalmological Congress*, July 22nd and 23rd, 1915, p. 173.

(3) Jackson, Edward. Tuberculosis of the retina, recurring hæmorrhage and retinitis proliferans. *Ibidem*, p. 198.

(4) **Bredeck, J. F.**—**The choroidal tubercle in tuberculous meningitis.** *American Journal of Ophthalmology*, January, 1916.

(5) **Lundsgaard, K. K.**—**The so-called primary tuberculosis of the conjunctiva and the congenital tuberculosis of lupus patients.** *American Journal of Ophthalmology*, February, 1916, translated from *Klin. Monatsbl. f. Augenheilkunde*, Vol. LV, p. 97.

(6) **Jocqs and Duclos.**—**Ocular tuberculosis secondary to an industrial accident. A clinical and anatomical study. (Tuberculose oculaire secondaire à un accident de travail. Etude clinique et anatomique.)** *La Clinique Ophtalmologique*, mars, 1916.

(1) **Kohn**, of Rostock, after reviewing the literature of tuberculosis in the eyes of animals, gives a detailed description of the microscopic examination of the eyes of an ox affected in this way.

The *post-mortem* examination detected no trace of tubercle in any part of the body outside of the eye. In the right eye there was tubercle of the iris and ciliary body. In the left there were changes, consisting of small-cell infiltration, giant cells, and epithelioid cells, chiefly in the optic nerve sheath, but also in the nerve itself. No bacilli were found, but the author looks upon these changes as tuberculous.

In the bibliography which is appended, especial prominence is given to the work of Manleitner, *Archiv f. Ophthalmologie*, Vol. LXI, p. 152, 1905.

A. J. BALLANTYNE.

(2) **Luedde**, of St. Louis, sets out to enquire how we can explain ocular tuberculosis in patients approximately one half of whom manifest no constitutional disease. He believes that the direct cause of most of these cases of ocular tuberculosis is to be sought in a primary tuberculosis of the nasal passages or accessory sinuses. He has been led to this conclusion by finding that by the injection of tuberculin in cases of ocular tuberculosis, the nasal reaction is seldom absent. The clinical signs of the nasal trouble may be extremely slight, for it is possible that tuberculous necrosis may be preceded for a considerable interval by tuberculous ulceration. The nasal reaction may manifest itself simply as an increased localized hyperæmia, such as must be observed by a competent rhinologist.

SYDNEY STEPHENSON.

(3) **Jackson,** of Denver, reviews our knowledge of recurring hæmorrhage into the retina and vitreous of young persons, and reports two cases. One was in a lady of 20 and the other in one of 27 years of age. The retinal veins were enlarged, and there were floating vitreous opacities, retinal hæmorrhages, and signs of retinitis proliferans. The tuberculin reaction was positive. The first patient received at intervals of one week, or longer, nineteen therapeutic injections of tuberculin, while the second received twenty.

Jackson reports cases, allied to his own, put on record by Cords, Igersheimer, Harms, Knapp, Agricola and Thies, Stock, Gilbert, Fleischer, Oloff and Onishi.

The active tubercle remains comparatively free from newly-formed vessels. The vascular walls, however, undergo weakening and ulceration, so that the tendency to hæmorrhage is one of the prominent characteristics of tuberculous disease. On the other hand, the tubercle may heal and be wholly replaced by connective tissue.

In retinitis proliferans we have the same association of pathologic processes. The few cases that have been studied anatomically, response of a larger number of cases to the tuberculin test, and the relative recoveries that are now put down to the recognized treatment for tuberculosis, give sufficient basis for the view that tuberculosis, chiefly of the retinal vessels, is the essential nature of the clinical condition represented by the above cases of recurring retinal hæmorrhage in young persons followed by retinitis proliferans.

SYDNEY STEPHENSON.

(4) **Bredeck**, of St. Louis, has endeavoured to settle the question of the frequency of choroidal tubercles in tuberculous meningitis by reference to the literature. He has found the literature extremely unsatisfactory, because (1) complete autopsy reports, especially ocular, have been neglected in tuberculous meningitis; (2) the number of ophthalmoscopic examinations made is often not stated; (3) routine accurate examinations with the ophthalmoscope have been neglected; (4) negative ophthalmoscopic findings have gone unrecorded; (5) lumbar puncture has led many to neglect ophthalmoscopic examinations. Bredeck suggests the correction in the future of all these errors. Bredeck condemns alike the text-books on medicine, pediatrics, neurology, and ophthalmology for their imperfect accounts. Finally, he suggests that choroidal tubercle "should be found in fifteen to twenty per cent. of all cases of tuberculous meningitis."

There are thirty-three references in the bibliography which is appended.

ERNEST THOMSON.

(5) We should have liked to present to readers of THE OPHTHALMOSCOPE the conclusions come to by **Lundsgaard**, of the Finsen Light Institute, Copenhagen, as to the question of hæmatogenous or ectogenous infection in conjunctival tubercle. Unfortunately, the reviewer finds himself quite unable to decide what these conclusions are, and must therefore refer readers either to the original (if it can be obtained) or to this translation. There is, however, one conclusion to which Lundsgaard has come quite definitely, and it is conveyed in the following words:—"However, it cannot be doubted that Finsen's treatment of conjunctival tuberculosis is superior to all other methods, and if some cases are reported in literature in which it was unsuccessful, the cause was probably a faulty *technique*." S. E.

(6) The very important case put on record by **Jocqs and Duclos**, of Paris, although given in great detail by the authors, may be easily summarised in a few words.—A boy of 15 years, was struck in the right eye by a chip of iron when at his work. The small corneal ulceration produced, was completely cured in a few days. But in spite of complete healing of the cornea, pericorneal redness did not disappear, and photophobia persisted. Between a fortnight and three weeks after the accident, the cornea began to show signs of an interstitial keratitis. To cut a long story short, this advanced, developed the characteristics of a tuberculous keratitis, the iris became affected and presented yellowish-pink granulations. Then the upper ciliary region became thinned, bluish, and finally staphylomatous. The tension was low, and there was no pain even on pressure. Tuberculin treatment was refused by the parents.

The eye was eventually excised at the end of four months.

Histologically, there was no doubt as to the tuberculous nature of the lesions, which mainly affected the anterior segment, but tubercle bacilli were not found. Inoculation experiments do not seem to have been undertaken.

The interest of the case lies mainly in the fact that following a trifling accident to the eye, a boy of 15 years of lymphatic aspect, whose mother died of a pulmonary affection, developed ocular tuberculosis (for the description of the lesions hardly leaves room for doubt as to the ætiology), and lost his eye.

ERNEST THOMSON.

IV.—INJURIES OF THE EYE IN WAR.

(Third Notice.)

(1) **Wood, Casey A. — Shrapnel wound of the occipital region with involvement of the visual centres.** *Ophthalmic Record*, August, 1915.

(2) **Grosz, Emil von.—Injuries and diseases of the eye and blindness in war. (Augenverletzungen, Augenkrankheiten und Erblindungen im Kriege.)** *Wien. Klin. Wochenschr.*, November 11th, 1915, No 45, p. 1217.

(3) **Guglianetti.—Injuries of the eye observed during the war, with special regard to indirect alteration of the deep membranes. (Sui traumatismi di guerra del bulbo oculare, con particolare riguardo alle alterazioni indirette delle membrane profonde.)** *Archiv. di Ottal.*, January, February, March, 1916.

(4) **Meyerhof, M.—Night-blindness as an affection of war. (Nachtblindheit als Kriegskrankheit.)** *Centralbl. f. prak. Augenheilkunde*, January-February, 1916.

(5) **Weekers, L.—Hemeralopia among soldiers. (L'héméralopie chez les soldats.)** *Archives d'Ophtalmologie*, mars-avril, 1916.

(6) **Ormond, A. W.—The treatment of "concussion blindness."** *Guy's Hospital Gazette*, March 25th, 1916.

(7) **Aubineau, E.—Cataract and aphakia from the military point of view. (Cataracte et aphakie au point de vue militaire.)** *La Clinique Ophtalmologique*, avril, 1916.

(8) **Angelucci, Arnaldo.—The protection of the eyes of soldiers and the re-education of those blinded in war. (La protezione degli occhi dei soldati, e la rieducazione dei ciechi di guerra.)** *Archivio di Ottalmologia*, April, 1916.

(1) **Wood,** of Chicago, records the case of a soldier who was struck on the back of the head by shrapnel fragments. He did not become unconscious, and was able to walk immediately afterwards. The injury seemed to have involved the scalp only, but the wound became septic, and a piece of shrapnel was then found and removed. About six weeks after the original injury, he developed cerebral symptoms : vertigo, loss of consciousness, and convulsions. When seen by the writer, about nine weeks afterwards, he complained of headache and blurred vision. The eyes showed signs of a recent although receding mild bilateral papillitis. The visual fields showed a decided and somewhat concentric contraction for white, red, and green and a slight contraction (10°-20°) on the right side. Hot fomentations, followed by very cold applications to both temples and ocular regions, gave relief to the headaches.

The author raises the question whether the eye symptoms were entirely due to traumatism or to infective meningitis. J. JAMESON EVANS.

(2) **Emil v. Grosz,** of Buda-Pest, points out that eye-wounds are much more numerous in the present war than in previous wars, such as the Franco-Prussian or the Russo-Japanese, and reviews the measures taken in Hungary and Buda-Pest to meet the demand for hospital accommodation.

I.—Eye injuries.

The majority are caused by bullet wounds, and, in the author's experience, blindness resulted in one eye in nearly half the cases, in both eyes in 10 per cent. The disruptive or explosive effect of the bullet is such that the eye may be so shattered that hardly a fragment is discoverable ; in other cases the eye may be forced out of the orbit altogether by a bullet passing behind it. Cases were reported in which the uninjured eye was caught in the soldier's cap as it fell from his head. The same explosive force explains those cases in which the sclera is burst or intra-ocular hæmorrhage occurs, although the bullet did not touch the eye, or even pass close to it. Detachment of the retina or rupture of choroid may occur in cases in which the bullet passes at a relatively considerable distance. Injuries of the lids are common from bullet wounds, and should be stitched together at once, to avoid adhesions which afterwards necessitate extensive plastic operations. Enucleation is often necessary to avoid sympathetic, which is very much less common than in 1870. This is explained by better treatment of wounds, less interference with injuries, and—most important—timely enucleation. Great care should be taken to preserve conjunctiva. Nearly all the enucleations were done under local anæsthesia, and the prothesis fitted in a a month, or, in urgent cases, in ten days. Some cases of bullet wound of the orbit and brain are discussed. The X-rays, Sweet's localiser, the sideroscope, and Haab's magnet were used in connection with the management of foreign bodies in the eyeball. In cases of explosion, air pressure alone may be responsible for such lesions as choroidal rupture or opacity of the retina. Cataract due to this cause resorbs spontaneously. Traumatic neurosis is a common sequela of explosions. Grosz met with few cases of stabs of the eye, but naively suggests that they are probably quite common in the ranks of the enemy who are obliged to suffer the Hungarian bayonet attacks. [This speaks well for the adversaries. Perhaps if the Herr Professor had looked, say, in the gluteal regions of the Hungarian troops, he might have found the stab-wounds.—H. M. T.]

II.—Diseases of the Eye.

At first patients with merely simple conjunctivitis were sent to base hospitals, but afterwards these cases diminished, while gonorrhœal conjunctivitis became serious, one or both eyes being lost in several cases. The question of trachoma is discussed at some length. Apparently the exemption of trachomatous subjects from military service had induced such men to neglect treatment. It was therefore decided to accept all cases which appeared capable of successful treatment, excluding only those with permanent damage to cornea and lids. The former were placed under treatment for six months, and those which could not be improved in that time were also excluded. At the outbreak of war these arrangements were suspended, and the matter was apparently left to individual initiative. In some cases trachoma companies were formed, in others the affected men were grouped into labour parties. As soon as the men found that trachoma did not mean exemption they came eagerly for treatment, and self-infection disappeared, while a considerable number were saved for the army who would otherwise have been rejected owing to mistaken diagnosis. The author holds strongly that trachoma should not entail exemption, but that all affected soldiers should be collected, classified, and suitably dealt with ; only those with sequelæ being discharged. Trachoma must be regarded as one of those diseases which endangers the military value of an army.

As a war disease, hemeralopia is of particular interest. Many of the cases were really retinitis pigmentosa, and should have been excluded. Most, however, have normal vision, full fields, and no fundus change. The author considers the condition to be torpor of the retina, due to hardship and insufficient nourishment. Diagnosis is easy by Nagel's adaptometer or Förster's photometer; or the luminous watch, or bits of white paper, in a darkened room may be used, the examiner taking his own vision as a standard. Nervertheless, it is not to be wondered at if many of these men are accused of malingering.

With regard to visual standards, Grosz has been convinced by his experience that a thorough and energetic revision of the regulations is required. Many soldiers whose vision is below the limit are capable of good service. The standard for vision should be reduced, and that for permissible myopia raised. Astigmatics should be provided with cylindrical corrections; the objection that such glasses are difficult to replace is not to be considered. The author's last paragraph on this subject is as follows: "It is known that under the regulations, soldiers with retinitis pigmentosa, optic atrophy, or even almost ripe cataract are accepted. It goes without saying that these are not suitable and only become a burden, as it is often weeks, or even months, before they are got rid of, but a revision of the regulations would give the army thousands of combatants. At the present day, when we are engaged in a life and death struggle, myopes of 8 dioptres, astigmatics of 2 to 3 dioptres, and men with vision of 5/15 should not be excluded." The 5/15 refers, of course to *corrected* vision. From this it will be apparent that in Austria-Hungary also the management of the vision question by the military authorities has been subject to criticism. At the present time in our army glasses above 6 dioptres are not provided (Reviewer).

III.—Blindness in War.

A commission was appointed in February 1915, to organise the care of blind soldiers. It estimated the number as 80 to 100 in the first year of the war in Hungary, about the same in Austria, and 400 to 500 in the German Empire. These men should be collected into one hospital, where proper teaching and technical instruction can be given, and it is essential that the capacity to earn should be preserved. As the result of a competition organized by the author for the best work on the ultimate fate of the blind, forty-two essays were obtained from Germany, Austria, and Hungary, which will shortly be published. Thorough organization and no dispersion of effort should be aimed at. At the same time, Grosz believes that institutions and asylums are not the proper means for enabling the blind to enjoy life in the widest sense of the word; but that the advantages of individual freedom must be secured. The blind man must be able to choose his own occupation, home, and surroundings, and it is the duty of the State to assist him to make the most advantageous choice.

The paper concludes with some general remarks on the blind, and on the position of ophthalmology in military medicine. H. M. TRAQUAIR.

(3) In this long and interesting paper, **Guglianetti**, of Naples, analyses the first fifty cases of ocular injury which have come under his observation.

As to the frequency of injuries, he finds that splinters are a much more common cause of damage than bullets, whether rifle or shrapnel, in the proportion of 78 to 22.

Naturally, shell injuries are the most extensive generally; hand grenades give rise to injury by small fragments.

Rifle bullets are the most fatal to the eye; generally, their direction is transverse; an antero-posterior course is usually mortal. In three cases of transverse wound, total blindness resulted; these were the only transverse wounds recorded.

The most interesting part of the paper, as its title leads one to expect, is that which deals with indirect injuries. In these accidents, the lesions vary from a small rupture of the choroid, with hardly any disturbance of vision, to extensive rupture, atrophic choroido-retinitis, and retinitis proliferans.

"In those cases in which the globe is not touched, and the foreign body does not enter the orbit, one may invoke the following explanation," says the author. "When the projectile strikes the orbital wall, it communicates thereto vibratory movements, which represent a great part of the energy with which it was travelling. The exact number and nature of these vibrations are not yet well-known, but there can be no doubt that they have a relation to the force of penetration and rotation of the projectile, and, on the other hand, to the elasticity and conformation of the bone struck.

"Dantrelle has observed that the end of the eyebrow and the malar bone are special danger points. From the orbital walls the vibrations are transmitted to the contents of the orbit and eventually to the eye.

"The changes in the deep membranes may be produced by the vibratory shock directly, or may be due to the fact that the vibrations of the ocular membranes do not synchronise with those of the vitreous. Hence the conflict between the two sets of vibrations, damaging the delicate macular retina."

As to retinitis proliferans, he holds that it is proved that a vitreous hæmorrhage alone cannot start this, but that there is also required a rupture of the retina or choroid with which the hæmorrhage must be connected.

H. GRIMSDALE.

(4) This article by **Meyerhof**, of Cairo, is mainly historical, and deals with night blindness during the Napoleonic wars.

Meyerhof himself has seen only two cases, one caused by corneal opacities, and the other by astigmatism (*sic.*). He believes, however, that no single cause accounts for the night blindness seen during the present campaign. He mentions cases of congenital hemeralopia in soldiers, who, on account of that defect, were unfit for duty. The author gives references to cases described during the present war by Braunschweig, Zade, Best, and Paul. The condition was especially prevalent during the winter 1914-15, and occurred in the trenches. It was seldom met with during the campaign in the East, despite the greater fatigues and the ofttimes poor food supply.

SYDNEY STEPHENSON.

(5) **Weekers**, *médecin adjoint de l'armée belge*, describes night blindness as he has observed that condition among Belgian soldiers engaged in the present war.

Trench warfare characterised, as it is, by nocturnal activity, is very apt to exaggerate the troubles of night blindness in individuals who present insufficient retinal adaptation, as well as to give rise to the trouble *de novo*. The difficulties of men or officers affected in this way are very real. At night time they become so blind as to be quite unable to orient themselves. They cannot move from point to point without danger of falling into the ditches or the holes (often filled with water) excavated by the explosion of shells. They are quite incapable of finding their way unless helped by their companions. They are apt to complain loudly of their troubles. Night blindness affects, without distinction of age, men of all arms, although it is particularly common in the infantry as compared with the cavalry, because the latter are subjected to comparatively little service in the trenches.

During eight months of the year 1915, Weekers saw 3,977 eye patients, and of that number there were 409 (10.2 per cent.) who complained of night blindness. The number per month varied from 1.7 per cent. in July to 19.1 per cent. in January, from which Weekers concludes that the cases are particularly numerous during the winter months, when the nights are long. The author found among the 409 soldiers complaining of night blindness, 47 who were affected before the war.

Epithelial xerosis (" Bitôt's spot ") was never seen in soldiers with night-blindness, but there was often some degree of external irritation of the eye. The author notes that errors of refraction were particularly common. For example, among the 409 cases, 293 (73·2 per cent.) presented ametropia of more than 1 D. (115 myopia, 82 hypermetropia, and 96 astigmatism). The acuity of vision was normal when errors of refraction were corrected. Peripheral vision was full, even when estimated in a feeble light. The majority of the affected soldiers were in good general condition, and signs of depression were the exception.

Weekers expresses a strong opinion that the complaints of those with night blindness were founded upon fact, and gives at length his reasons for this conclusion. He entertains no doubt that in many cases the condition has been acquired during the campaign.

In discussing the pathogeny, Weekers distinguishes sharply between (*a*) congenital, and (*b*) acquired hemeralopia. The manifestations of the former may be aggravated by life in the trenches, and it is probable that the very existence of the trouble is frequently unknown to the patients, who are then inclined to attribute their distress to the conditions of their new life. On the other hand, acquired hemeralopia appears to result from several causes, of which the chief are overwork, nervous exhaustion, and the anti-physiological character of life in the trenches. The diet of the soldier plays, in Weekers' opinion, a very small part. Ocular fatigue, as from errors of refraction, or superficial inflammation, acts as a predisposing cause.

With regard to treatment, that must above all be causal, keeping in mind military needs. One of the most efficacious means is the exact correction of anomalies of refraction, and, in particular, of astigmatism. The use of smoked glasses during the day time is an excellent adjunct Rest, and a varied diet, together with the administration of iron or arsenic, are useful. As regards aptitude for military service, the prognosis of night blindness is, upon the whole, favourable. The milder cases are often much improved by the correction of errors of refraction. In more marked cases it is wise, although retaining the patient in the ranks, to obtain for him lighter duties for several weeks.

Acquired hemeralopia of itself does not justify dismissal of the patient from the service.

Finally, Weekers urges that steps should be taken to exclude recruits whose power of retinal adaptation is obviously insufficient.

SYDNEY STEPHENSON.

(6) Few war lesions are of greater interest than those cases that have been collectively termed " concussion blindness "—that is, a condition in which a soldier is rendered unconscious by the explosion, in his immediate neighbourhood, of shells, bombs, hand grenades, and so forth, and on regaining his senses, finds that he is unable to see. Definite organic injuries may or may not be sustained by the eye.

In the treatment of the condition, **Ormond,** of London, had at first little success, but since he has tried suggestion and hypnosis his results have been most encouraging. The patient (with closed eyelids) is put into a comfortable chair in a quiet and darkened room. He is instructed to think of something pleasant and agreeable, and, so far as possible, to make his mind a blank. The usual methods of inducing hypnosis are then employed. It is not necessary to obtain complete unconsciousness in order to succeed, but when the patient is under the influence of light hypnosis he is subjected "to a forcible suggestion from the operator, who reiterates the patient's ability to see and to open his eyes, and asserts very vehemently that he is not blind as he imagines, but that his eyes are perfectly sound and that he *can* see."

All cases treated in this way have shown marked improvement. In the case of Private B., aged 22 years, the result may fairly be described as dramatic. This soldier was rendered unconscious by a shell striking the sand-bags in front of his trench. He remained unconscious for twenty-four hours, and then found that he was completely blind, except that he could just distinguish light from dark with his left eye. He suffered from severe headache and was partially deaf. The latter two symptoms speedily passed away, but the condition of the eyes had not altered. When seen by Ormond, sixty-one days after the injury, he was quite blind, with nothing to show for it. Under hypnosis, the patient was told that he would be able to see when he woke up, and the moment he woke the suggestion was repeated very forcibly and his eyes were held open. "He cried out that he could see, tears ran down his cheeks, and he fell on his knees in gratitude, as he thought he was permanently blind and believed that his sight had been restored by a miracle."

It should be added that **Major A. F. Hertz, R.A.M.C.**, was associated with **Captain A. W. Ormond, R.A.M.C.**, in the treatment of the cases described. SYDNEY STEPHENSON.

(7) **Médecin-Major Aubineau** discusses cataract and aphakia as they affect military service in France. It will suffice to give his conclusions. To what extent these are in agreement with British practice, the reviewer is unable to say :—

1 A non-operated cataractous eye involves exclusion from army service, and permits of service in the auxiliary forces only.

2 A cataractous eye successfully operated does not involve exclusion from army service.

3 Operation is in order under service conditions, that is, if the eye is in an operable condition.

4 An operation followed by a good result does not discharge the State from responsibility, since every aphakic eye involves a permanent incapacity, but diminishes the State's responsibility if the damage done to the wounded man is lessened. ERNEST THOMSON.

8. In this paper, **Angelucci**, of Naples, deals with two most important subjects and the first has special interest for English ophthalmologists. Angelucci describes the various protective measures taken in the various parts of the opposing forces, and concludes that those taken by the English authorities are, at least in many respects, the least efficient of all.

He points out that blindness is due both to direct injury to the eyes and also to indirect injury of the bones of the face. These have been to some extent guarded against by means of protective goggles, and helmets ; but he points out that the two most dangerous points for indirect violence, the external angular process and the malar bone, are very inefficiently protected in any pattern of protector that he has seen.

The ideal goggles should cover the eye itself and also these dangerous regions ; vision should be possible through fine slits in the steel plate. Behind this should be a plate of mica, and the whole should be sewn into some material fitting close to the skin, so that the entrance of "lacrymating" gases be prevented.

The helmet, besides protecting the head from injury to the brain, should protect the lateral temporal region, so as to make impossible those transverse injuries which destroy both eyes; in the German pattern, the helmet fits well to the sides of the head and offers considerable protection to the temples. In the French pattern, which has been adopted also by the Italians, the lateral protection is less efficient, but it is simple, as Angelucci points out, to modify it by means of a small additional plate, so as to give good protection. The English pattern, however efficient as a guard against injury to the calvaria, is of no use as a lateral protection; the importance of Hertel's statistics on the percentage of eye injuries in the present war, seems, says Angelucci, to have been recognised by the Germans and seriously considered by them. "It is certain that those who designed the English helmet, have paid no attention to them."

This is Angelucci's statement, the statement of one of our friends. Is it impossible that some attention should be paid to this matter?

HAROLD GRIMSDALE.

V.—METHODS OF EXAMINATION.

(1) **Erggelet, H.**—The value of Fick's contact glasses for the investigation of binocular vision through spectacle lenses. (Die Bedeutung der Fickschen Kontaktgläser für die Beurteilung des zweiäugigen Sehens durch Brillengläser.) *Klin. Monatsbl. f. Augenheilk.*, February, 1914.

(2) **Landolt, E.**—The double prism (new model). [Le double prisme (nouveau modèle).] *Archives d'Ophtalmologie*, février, 1914.

(3) **Dennis, David N.**—An attachment for taking light fields. *Archives of Ophthalmology*, November, 1914.

(4) **Duane, A.**—The tangent curtain. *Archives of Ophthalmology*, November, 1914.

(5) **Luedde, W. H.**—An accurate method to record the actual size of lesions in the ocular fundus. *American Journal of Ophthalmology*, June, 1915.

(6) **Howe, Lucien.**—A more exact method of measuring fields of vision and arcs of rotation. *Trans. Amer. Ophthalmological Society*, Vol. XIV, Part 1, 1915, p. 183.

(1) Fick's contact glasses, lenses carefully ground to lie in intimate contact with the cornea, can be employed to imitate any desired error of refraction, and thus to enable us to study how it feels to wear correcting glasses of different kinds and under different conditions.

Erggelet, of Jena, has carried out some experiments along these lines. Having rendered his eyes anisometropic, he found that when wearing the correcting lenses, he experienced the discomforts complained of by anisometropes when asked to wear two widely differing lenses. The author shows, both from his own experience and by calculation, that this discomfort is due to two factors. In the first place, when the corrected eye looks away from the fixation point to a laterally placed object, it must either (as in hypermetropia) make a larger movement than would the emmetropic or uncorrected eye, or it must (as in myopia) make a smaller excursion. Where the two eyes are very different, a muscular adjustment will be required in a lateral or vertical direction, in order to avoid diplopia. Again, there will be a difference in the sizes of the two retinal images, but this is of quite secondary importance.

A. J. BALLANTYNE.

(2) **Landolt,** of Paris, has had made for him by Messrs. Zeiss, certain improvements on the double prism of Crétès as follows.—The divisions marking the angles of deviation and the metrical angles both appear on the face of the instrument, the former in the upper half of the circle, and the latter in the lower half.

The figures indicating the interpupillary base lines, *i.e.*, 58, 60, 62, and 64 mm. respectively, are placed above the circles which correspond. The combination of the two prisms chosen gives a maximum of deviation of rather more than 17 degrees. A shield of ebonite which, when the instrument is in use is always directed to the temporal side, is added to cut off the light.

The whole is mounted on a solid metal handle. BERNARD CRIDLAND.

(3) **Dennis,** of Erie, Pa., describes an attachment he has devised to be fitted to the de Zeng ophthalmoscope. It consists of a long arm, carrying a little box in which the electric light bulb is situate. Diaphragms and coloured glasses can be adapted to it. This instrument he finds very serviceable in mapping out scotomata on a Bjerrum screen.

R. H. ELLIOT.

(4) **Duane,** of New York City, has for many years been using the tangent curtain for the following purposes.—(1) To delimit central and paracentral scotomata and enlargements of the blind spot; (2) to delimit the field of vision; (3) to plot the field of fixation; and (4) to plot diplopia and the field of double vision.

There is nothing new or remarkable in the communication, nor does its author pretend that there is; but it is interestingly written, it gives useful details, and many of the lesser points made strike one as ingenious, and worthy of note for future imitation of the methods described. R. H. ELLIOT.

(5) **Luedde,** of St. Louis, has applied a micrometer scale to the eye-piece of the Gullstrand ophthalmoscope, which latter instrument he has found of special service in virtue of its demonstration ocular. As to the micrometer scale, while of course an accurate measurement of the actual size of a fundus lesion would involve mathematical calculation in each case, the relative size is itself an important matter. By the use of the scale, it is possible to tell whether a lesion has or has not increased or diminished after a given time. Luedde has satisfied himself by many observations on the disc that the instrument is accurate in determining relative sizes. He hopes that after the war, the Gullstrand instrument will be available to every ophthalmologist, whether or not in his actual possession. Meantime, of course, the supply is in abeyance. ERNEST THOMSON.

(6) **Lucien Howe,** of Buffalo, describes certain appliances whereby the exactness of measurements of the fields of vision and of the arcs of rotation of the perimeter can be greatly increased.

In order to bring the centre of the observed eye to the centre of the arc in perimetry, we make use of the simple fact that the centre of the arc of a circle, like that of the perimeter, lies at the intersection of any two of its radii. Most perimeters have an opening in the centre of the arc through which the observer can look straight at the observed eye. It is therefore easy to place the eye on the line of that central radius. To place the observed eye in the line of some other radius, however, requires more care. For this purpose a brass strip, about 5 cm. long, is attached to the edge of the "carrier," and being attached at right angles to the face of the carrier this strip is in the line of a radius of the arc of the perimeter, no matter at what point the carrier is placed. If now one end of this strip be turned at right angles to its flat surface and be made pointed, and the other end also be turned in the same manner and be provided with a small notch at the end, the whole strip forms a "gunsight," the line of which is in the line of a radius of the arc of the perimeter. The surgeon sights along the line of the gunsight at the globe, and moves the head of the patient until the line of the gunsight strikes near the edge of the observed cornea. The prolongation of that line along the gunsight would evidently intersect the centre of the globe, and in that position the centre of the eye would correspond to the centre of the arc of the perimeter. The next point is to keep the observed eye in position, and to do that, the head must obviously be firmly fixed. The usual chin-rest is entirely inadequate for the purpose. Howe uses the Helmholtz wooden "bite", now adapted to Stevens' tropometer and some other instruments. The usual method of taking the field of vision by passing a white or coloured object of indefinite size along the arc of a perimeter in daylight of indefinite illumination is a test without much scientific value. The source of illumination should be a very weak electric light in a perfectly dark room. The light which seems best for perimetry is not more than one-fifth of a candle-power passing through an opening 1·5 mm. in diameter, shaded by a protective covering. As to the colour of the light, the exact shade is not of as great importance as the makers of some perimeters would have us believe. An important point is that the light emanating from the object of whatever intensity or colour shall not cause reflections on other parts of the perimeter or from objects in the room. Reflections from the instrument itself can be obviated by placing a cylinder around the light and blackening the inside of the cylinder. The test-object should be called to the attention of the patient in such a way as to eliminate as far as possible the element of suggestion. The test-object should be slid quietly along the arc, and then, without saying a word, the circuit should be closed and the light flashed. The patient should then raise his finger; for if he attempts to speak, he is apt to remove his teeth from the bite and to disturb the position of his head. Finally, a self-registering attachment is a very convenient, although not an essential part of every perimeter.

When the perimeter is used as a tropometer, an electric light of several candle-power is necessary to show the corneal reflex distinctly, even in a dark room. Howe notes that the extent of the arc rotation is in itself a small indication of the motility of the globe in any direction.

SYDNEY STEPHENSON.

VI.—LEGISLATION CONCERNING OPHTHALMIA NEONATORUM.

Allport, Frank.—State legislation concerning ophthalmia neonatorum. *Ophthalmology*, January, 1916.

Allport, of Chicago, deals mainly with the measures which may be taken by the State or by central organisations in order to reduce the frequency and dangers of ophthalmia neonatorum.

After giving figures to show the frequency of the disease and its cost to the State, he makes a number of brief statements which cover the modern views regarding the ætiology, prophylaxis, and treatment of ophthalmia neonatorum.

He then sketches the lines on which he thinks State legislation should proceed. Believing that great benefit would arise from the distribution of "brief and pointed" leaflets to doctors, midwives, expectant mothers, etc., he gives a sample of such a leaflet, describing what should be done before and after the birth of the child, in order to prevent the occurrence of ophthalmia. The leaflet is not very brief, and would, we fancy, rather overwhelm the average ignorant mother for whom it is intended, but perhaps the author's experience justifies its form. It would not be altogether applicable to conditions in this country.

Allport then proceeds to an analysis of the measures, legislative and others which have been taken in the different States of the Union to combat the disease, and for its prevention. In one-third of the States there are still no laws on the subject. There are a good many differences in the practice of the other States. Most of them include in their definition of the disease all inflammations with discharge occurring within two weeks after birth. Some States furnish the prophylactic drops free to doctors or midwives, or both, along with instructions for their use, advice, copies of the laws, etc. In some, the use of the prophylactic is obligatory at every birth. In others, the doctor or midwife must advise the use of a prophylactic and try to obtain the consent of the parents. The solutions usually recommended are 1 per cent. silver nitrate, 25 per cent. argyrol, and 5 per cent. protargol. Some of the States require that when a birth is reported, it shall be stated whether prophylaxis against ophthalmia neonatorum was or was not employed. This is a provision which, it seems to the reviewer, might be adopted with advantage as a general rule, not with a view to forcing the hands of the practitioner, but in order to throw light on the efficacy of, and the need for, prophylaxis in different areas

A. J. BALLANTYNE.

VII.—EPIBULBAR EPITHELIOMA.

(1) Danis, Marcel. — Epithelioma of the sclero-corneal limbus. *Ophthalmology*, October, 1911.

(2) Profeta, Liborio. A clinical note on epithelioma of the cornea. (Epiteliome della cornea. Contributo clinico.) *La Clinica* (*Catania*), December, 1911.

(3) Menacho.—A case of epithelioma of the cornea. Epitelioma pavimentoso de la cornea.) *Arch. de Oftal.*, July, 1915.

(1) The patient was a woman, 65 years of age. When first seen by **Danis**, of Brussels, the tumour measured 8mm. by 6mm., and was 3mm. thick. It had begun as a small spot at the inner limbus a year before. It extended both over the cornea and over the bulbar surface, and the

corneal part could be raised with a stylet. There was no necrosis or ulceration. It was removed with the knife, and the wound cauterised. Stitches were not used. No recurrence had occurred six weeks later. The clinical and microscopic appearances are illustrated.

A. J. BALLANTYNE.

(2) Epithelioma of the cornea is a very rare disease, and of those cases recorded the majority are not purely corneal, but are either of the limbus, of a pterygium, of scars involving parts other than the cornea, or are metastatic.

A few cases have been reported in which the disease seems to have really been primary in the cornea. **Profeta** considers four such cases to have been recorded and adds a fifth, from the Clinic at Messina The facts follow :—

A. S., aged 55 years, a peasant, stated that he had noticed for several months a small patch of pale rose colour in the lower paracentral region of the right cornea. The patch was slightly raised. There was some disturbance of vision, and slight injection of the ocular conjunctiva, especially in the lower half. Round the raised patch gradually developed a grey halo, and the vision diminished steadily, while the hyperemia increased. When seen, there was, near the lower end of the vertical diameter of the cornea, a nodule of new growth about the size of a coffee bean, of an irregularly triangular shape, flattened with the base upwards. The surface was rough from the presence of small prominences, which, in most instances, seemed papillary. The rest of the corneal surface was entirely invaded by the neoplasm. The eye was removed.

No microscopical details are given. H. GRIMSDALE.

(3) **Menacho** gives the details of a case of this very rare condition, in which the new growth was entirely confined to the cornea and had not spread to it from the limbus. H. GRIMSDALE.

VIII.—REFRACTION, ETC.

(1) **Emerson, Linn.—The relative importance of the fitting of glasses in ophthalmic practice.** *Ophthalmology*, January, 1916.

(2) **Jackson, Edward.—The adaptation of the test card to its double function.** *Ophthalmology*, January, 1916.

(3) **Rowe, E. Harrison.—Treatment of asthenopia dependent upon esophoria relative to near work.** *Ophthalmology*, January, 1916.

(4) **Stevens, George T.—On the declinations of the vertical meridians of the retina.** *Archives of Ophthalmology*, Vol. XLV, No. 3, May, 1916.

(1) This paper by **Emerson**, of New York, is a plea for recognition of the fact that errors of refraction may be the cause of many functional disorders other than headache and asthenopia. He also emphasizes the importance of very thorough and careful estimation of the error, keeping an open mind as to the methods to be used. A. J. BALLANTYNE.

(2) **Jackson**, of Denver, Colorado, points out that the test types are employed for two different purposes, namely, as a test for visual acuity, and for the subjective measurement of ametropia. Our present day cards are

better suited for the second object than for the first. As a test for visual acuity, types like those of Snellen fail somewhat owing to the differing visibility of different letters. The records of the individual worker are kept fairly uniform by the use of one set of types, or by the use of such phrases as "5/5, partly," but as Jackson puts it, "the '5/5 partly' of one card may be a record of better vision than the '5/4 mostly' from another card," so that the records of different observers are not transferable. The fault is, of course, still more notable in the case of certain picture test cards for illiterates. Jackson mentions, for example, a card on which a clock face is given for the 60 metre test. It subtends an angle of five minutes at 60 metres, but to recognize that it is a clock face one must see the hours and hands, and this is equivalent to Snellen's twelve metre type. The investigations made by a committee of the Section of Ophthalmology of the American Medical Association seem to show that the possible errors in V.A. due to the differing visibility of the letters are greater than those due to the colour and character of the surface on which the letters are printed, and even as great as those due to variations in lighting. There is therefore an urgent need for the better standardisation of test types. A. J. BALLANTYNE.

(3) **Rowe,** of Baltimore, advises that in every case the following tests be applied — Refraction with and without cycloplegic (he uses hyoscine hydrochloride, ½ gr. to the oz.); muscle balance tests with and without the optical correction; convergence near point; accommodation near point; and prism duction tests. In testing muscle balance, he uses the subjective screening test, both at five metres and at reading distance, estimating the error by prism correction, also Maddox's rod at both distances, and coloured prisms for the production of vertical diplopia.

The first step in treatment is to correct both latent and manifest hypermetropia. The full correction may be worn constantly, or a modified correction for constant wear and the full amount for near. Even where there is no spherical error, it may be advisable to order a convex lens for near work. In some cases the presence of a vertical deviation is an element in the case, and the correction of this by means of an appropriate prism may relieve the esophoria. Weak abduction may be treated by prism exercises, carried out for three or four minutes twice daily.

Illustrative cases are given. A. J. BALLANTYNE.

(4) **Stevens,** of New York, again endeavours to interest ophthalmic surgeons in the study of the directions of the retinal meridians in its bearing on the treatment of heterophoria and heterotropia. He first disposes of the fallacy that, under normal conditions, there is a tilting of the vertical meridians, whilst the horizontal ones remain in their true position. His work on this subject was one of the first fruits of the invention of the clinoscope. He differentiates carefully between declinations of the eye, which represent anomalous positions of that organ with reference to the cranium, and torsions, which are the outcome of the normal adjustments of the globes to the differing relations between the line of regard and the cranium. The former represent the anatomical relations of the eyeball to the cranium, the latter the physiological and necessary changes in the direction of the meridian, corresponding to the changes in the direction of the line of regard. He next proceeds to describe the clinoscope and the method of using it, and he maintains that all heterophoric conditions are, in reality, the manifestations of declinations, and that the rational and effectual correction of heterophoric conditions depends upon the correction of the declinations present. He contends that the routine determination of declination is of great importance, and that in the case of an operation

proposed for the relief of strabismus or of heterophoria, the information to be obtained by the use of a clinoscope is not merely useful, but is essential. In conclusion, he contends that examinations made by means of the clinoscope are in reality simple, although they require care in manipulation.

R. H. ELLIOT.

IX.—APPLIANCES.

(1) **Danis, M.—A portable ophthalmological case. (Trousse ophtalmologique portative.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) **Bordas.—A reduced size trial case for skiascopy. (Boite réduite de verres pour la skiascopie.)** *La Clinique Ophtalmologique*, 10 juillet, 1913.

(3) **May, Charles H.—A new electric ophthalmoscope.** *Ophthalmic Record*, August, 1914.

(4) **Maddox, E. E.—Improved axis finder.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIV, 1914.

(5) **Bjerke, K.—A new trial frame. (Ein neues Probiergestell.)** *Actes du* XII *Congrès International d'Ophtalmologie*, Petrograd, 1914.

(6) **Reitsch.—A pocket retinoscope that is also suitable for sight testing. (Ein Taschen-Skiaskop, das gleichzeitig zur subjektiven Brillenbestimmung zu verwenden ist.)** *Zeitschrift für Augenheilkunde*, January-February, 1915.

(7) **Gifford, H.—A spectacle frame for tennis players and farmers.** *Ophthalmic Record*, February, 1915.

(8) **May, C. H.—An electric ophthalmoscope presenting new features.** *Archives of Ophthalmology*, May, 1915.

(9) **Langdon, H. Maxwell.—The Ives-Langdon photometer.** *Trans. Amer. Ophthalmological Society*, Vol. XIV, Part 1, 1915, p. 144.

(10) **Shumway, Edward A.—A simple modification of the Berger loupe.** *Trans. American Ophthalmological Society*, Vol. XIV, Part 1, 1915, p. 158.

(11) **Williams, Charles H.—Nagel's anomaloscope for testing colour-vision.** *Trans. American Ophthalmological Society*, Vol. XIV, Part 1, 1915, p. 161.

(1) **Danis**, of Brussels, presented a case containing all the instruments necessary to the complete examination of the eye at the bedside of the patient.

MARCEL DANIS.

(3) **May,** of New York, has devised an electric ophthalmoscope which has several novel features. The advantages claimed for it are simplicity, superior illumination of the fundus, and the replacement of the customary fragile mirror by a solid piece of glass, which acts both as a condenser and as a reflector. The mechanism of the instrument is thus described.—"The metal filament lamp enclosed in the handle is a very small one (volts 2.75, amp. 0.1). This is sufficient because most of the rays are

utilized, whereas with the instruments hitherto in use only a small portion of the reflected light reaches the fundus. The divergent rays emanating from the lamp are made less divergent by a convex lens immediately above the lamp and are then conducted into a solid rod of glass which acts as follows:—The lower end of this refracting and reflecting device is convex and acts as a convex lens, making the rays more nearly parallel; they then strike the upper posterior portion of the glass rod which is here ground at an oblique angle to form a prism; this surface is silvered and acts as a plane mirror, reflecting the rays, so that they enter the eye of the patient. This condensing and reflecting device is attached to the anterior surface of the lens disc of an ophthalmoscope (the author's double disc instrument described in *Annals of Ophthalmology*, January, 1900) in such a manner that the upper extremity covers the lower half of the sight hole; the upper half is left free and through this semi-circular aperture the eye of the observer receives the rays, reflected from the illuminated portion of the background of the eye under examination. . The area illuminated represents an evenly lighted surface without reflex break, shadows or defects." The battery in the handle measures 5 inches by ¾ inch, and a rheostat regulates the amount of light. The instrument can be used as a transilluminator. J. JAMESON EVANS.

(4) **Maddox,** of Bournemouth, describes a modification of his simple wooden axis finder, which is so well known. The principle remains exactly as before, but the wood has been cut away, so as to allow the line looked at to be visible in a much greater portion of its length. There is no doubt that this will be an improvement on this exceedingly useful, and at the same time simpler, instrument. An alteration has also been made in the method of sighting the pendulum reading. ERNEST THOMSON.

(5) **Bjerke**, of Linköping, Sweden, describes a new trial frame made with the assistance of Messrs. Zeiss, which allows very accurate adjustment in all directions, and especially seeks to overcome the defect, common to most trial frames, that the lenses do not occupy quite the same relation to the eyes as those in the frame ultimately worn. A. J. BALLANTYNE.

(6) **Reitsch,** of Hirschberg i. Schles., has devised an instrument which contains a set of lenses arranged on two discs which can be rotated, so as to bring the desired lens before the aperture. One disc contains convex lenses from ¼-dioptre up to 17 dioptres. The interval from 0-6 is ¼ D. from 6-17 1 D. The other disc contains similar concave lenses. The illustration shows an instrument with only five lenses, so it is difficult to see where the others are concealed. A similar instrument, again with five lenses, contains cylinders. The whole apparatus, including test types, is contained in a metal case, which measures 18 by 8 by 2·5 c/m.

We have not been able to follow the inventor's description, but the box contains all that is necessary for retinoscopy and lens testing.

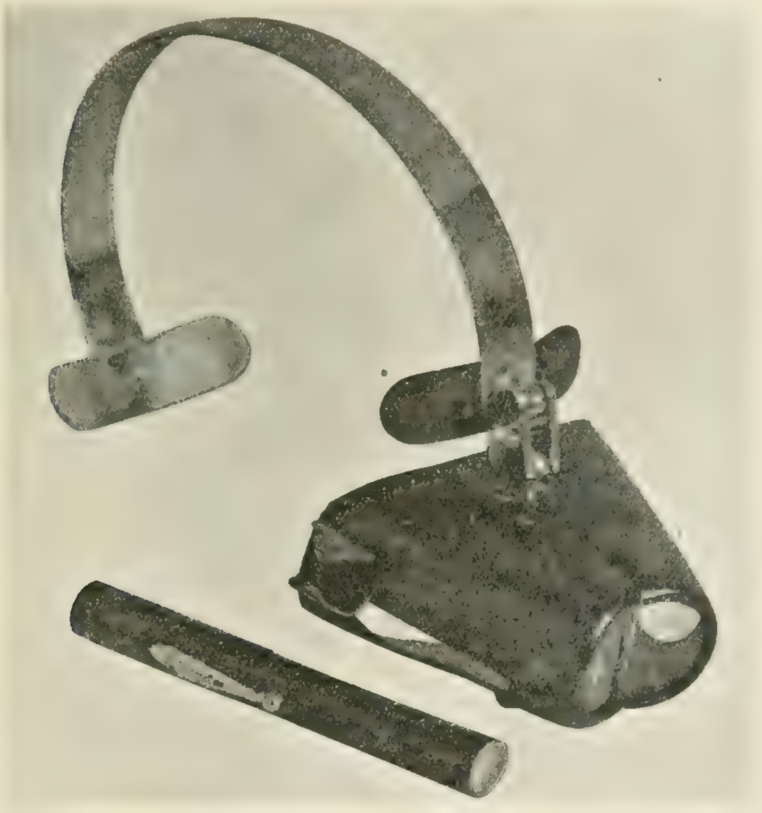
T. HARRISON BUTLER.

(7) **Gifford**, of Omaha, has had a pair of gutters made in aluminium, which screw on to the sides of the bridge and the outside parts of his spectacles to prevent the perspiration running off the eyebrows on to the glasses during exertion in hot weather. These fixtures might be a convenience to tennis players, farmers, and others. J. JAMESON EVANS.

(8) **May,** of New York, showed before the Ophthalmological Section, New York Academy of Medicine, an ophthalmoscope, presenting several new features. The usual reflecting mirror was replaced by a solid rod of glass, which was convex below, and therefore acted as a converging lens; it was ground at an angle of 45 degrees above; and was here silvered on the outside,

so as to act as a reflector. The film effect of the lamp was hidden, an even area of illumination being substituted. There are other features which are claimed to be valuable. R. H. ELLIOT.

(9) **Langdon**, of Philadelphia, assigns the lack of interest in the study of the light sense to several factors as follows.—First, the fact that a proper diagnosis can usually be arrived at without a study of the light sense. Secondly, that the time and opportunity for securing adaptation can seldom be secured during consultation hours. Thirdly, that no piece of apparatus is available whereby two or more observers working with different instruments may be expected to reach approximately similar conclusions.



Simple modification of the Berger loupe.

It is to supply the lack of a standardised apparatus that H. E. Ives and the writer have devised the one described in the present communication. Starting from the photometer described by R. Wallace Henry in 1896 (a box 33 cm. long and 16 cm. square, one end open, but covered with black velvet, and the other end having a 2 mm. opening, the spot to be illuminated), they have added a somewhat similar box divided into two portions—the diffusion chamber, 17 cm. square, lined throughout with porcelain, and the light chamber, 10 cm. long and 17 cm. square, containing the lamp. These chambers are separated by a partition, in the centre of which is an iris diaphragm with an opening variable between

6 mm. and 36 mm., controlled by an outside lever fitted with a mm. scale. The adaptation time is twenty minutes. Langdon has found that in fifty people between the ages of ten and fifty years the average opening of the iris diaphragm required to allow light enough to pass into the diffusion chamber to illuminate the sight-hole, so as to produce retinal illumination, is fifteen mm.

Instrument made by Wall and Ochs, Philadelphia.

SYDNEY STEPHENSON.

(10) **Shumway**, of Philadelphia, has added to the side of the Berger *loupe* a brass clip to take the small Tüngsten filament lamp recently introduced, which has about the appearance and size of a stylographic pen, and which can be purchased at any of the electric supply houses. The lamp gives sufficient light to illuminate satisfactorily the eye under examination. It is shown in the illustration.

In the discussion, **Marple**, of New York, said that he found the removal of foreign bodies from the cornea easy by employing the electric ophthalmoscope, armed with a convex lens of 12D. to 20D. behind the aperture.

SYDNEY STEPHENSON.

(11) In the opinion of **Williams**, of Boston, Mass., Nagel's anomaloscope is a valuable method of testing the colour-sense, especially in determination of doubtful cases. Its cost and delicacy, however, render the instrument not well adapted to routine examination of men at many places, but it should be available at some central station to which doubtful cases can be referred.

Williams explains the construction of the instrument, the method of use, and the principles upon which it depends. The communication is illustrated

SYDNEY STEPHENSON.

BOOK NOTICES

The American Encyclopedia and Dictionary of Ophthalmology. Edited by CASEY A. WOOD, M.D., C.M., D.C.L., assisted by a large Staff of Collaborators. Volume VIII.—H to Institutions for the Blind. Chicago: Cleveland Press, 1916.*

The most important article in this volume of the *American Encyclopedia* is, it will probably be conceded by all, that on Injuries of the Eye. The author is H. V. Würdemann, whose reputation in this direction is world-wide. The article extends to over 150 pages, but, being copiously cross-referred to other headings throughout the work, its extent as regards available information is really much greater. It is well written, in a clear-cut, direct-to-the-point manner, which is very commendable, although, unfortunately, none too common. The illustrations are numerous and include twenty coloured plates. Altogether, an article very well worthy of study.

Several biographies occur in the volume, that of Helmholtz being perhaps the most outstanding. Like the other biographical studies in the *Encyclopedia* it is by Shasted, and the author promises to include his recent translation of Helmholtz' *Beschreibung eines Augenspiegels* under the heading "Ophthalmoscope." Another interesting biography is that of Halifa, of Aleppo, who flourished in the thirteenth century. There are plates of thirteenth century instruments, accompanied by Halifa's descriptions of their use.

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* [illegible]

Under "Heredity in Ophthalmology" will be found a useful synopsis of the facts known about hereditary eye diseases.

"Herpes zoster ophthalmicus" is an article which the reviewer has read with the greatest interest and benefit.

In the article on "Ocular Heterochromia," a supplement by the Editor gives the latest views as to paralysis of the sympathetic.

Not content with the writing of innumerable biographies, Shasted has found time to prepare an essay on "Hindu Ophthalmology," which is certain to give pleasure to those who are interested in the historical side of the specialty.

There is a very useful study of "Hemiopia," well-illustrated with charts of the field of vision.

MacCallan's work in Egypt receives recognition under the heading "Institutions for the Blind."

Regarding "Homeopathy in Ophthalmology," we are told that the article has been contributed, by request, by a well-known and representative homeopathic ophthalmologist for the purpose of presenting an authoritative statement of the subject. Of this entirely unconvincing essay nine pages are devoted to an exposition of doctrine—very necessary perhaps—and five *lines* to the statement that homeopathy is applicable to ophthalmology. We shall be content to remark that the nine pages might very easily have been more usefully employed.

When dealing with Glaucoma in a previous volume, occasion was taken to criticise the description of Herbert's operation because the writer of the article had failed to realise that Herbert had introduced two entirely distinct operations, the wedge operation and small flap sclerotomy. The mistake is here perpetuated, the title reading "Herbert's operation. Wedge isolation operation for glaucoma. Small flap sclerectomy" (*sic*), while the operation is mentioned in the singular number in the subsequent text.

On page 5944 we are informed that "Hirundo rustica" is a species of leech. One may be excused for suggesting that the statement is difficult to swallow.

The reviewer feels that he should apologise for the disjointed character of his remarks concerning this eighth volume of the *Encyclopedia*. The fault, however, is not entirely his own. The volume, while in many ways excellent, contains relatively few articles of outstanding importance. Detailed reference to and criticism of many short articles, however important in themselves, would prove wearisome to readers. ERNEST THOMSON.

Hints on Refraction. By S. K. GANGULY, M.B., Assistant House Surgeon, Eye Infirmary, Medical College Hospital, Calcutta. Printed and Published by G. C. NEOGI, Nababibhakar Press, Calcutta. Price, 12 annas.

This little book has some features which recommend it. It is, however, too compressed to be useful to the student or to most beginners, except as a cram-book, after the subject has been mastered by wider reading elsewhere. Its most serious defect, however, is that it lays undue stress on the subjective, as compared with the objective, estimation of refraction. The important subject of retinoscopy is relegated to a short chapter of a little more than two pages at the very end of the book. No reference is made to the use of any form of astigmometer. On the other hand, some stress is laid on the employment of the stenopæic slit, the sunrise chart, and the clock-dial chart. To the reviewer's mind, this is going the wrong way to teach a student, or a beginner, the art of refraction. The bulk of the work should be done in the dark room, and the subjective examination should merely put the finish to it.

On the more pleasant side of criticism, it remains to be said that many points which are apt to puzzle the student are made clear in terse, explicit language; that a fund of useful information is to be found between the covers of the modest paper-backed volume (whose price, by the way, is only one shilling); and, finally, that the book is probably the first on the subject from the pen of an Indian.

If Dr. Ganguly would write a second edition, giving himself a little more space, and putting the objective side of the work, with which he must be very familiar, in the foreground, we believe that he would be doing a real service to his fellow-countrymen, in a land where the price of a medical book printed in Europe is a serious matter. R. H. ELLIOT.

THE OXFORD OPHTHALMOLOGICAL CONGRESS.

THE Oxford Ophthalmological Congress assembled at Oxford on July 13th and 14th last for its seventh annual meeting.

The Master, Mr. Sydney Stephenson, was unavoidably absent, to the great regret of all present, and his place was taken by the Deputy-Master, Captain P. H. Adams, R.A.M.C. (T).

As in former years, the social headquarters were at Keble College, whilst the scientific work of the Congress was carried on in the Department of Human Anatomy, kindly lent for the purpose by Professor Arthur Thomson.

Notwithstanding the small attendance, which was to be anticipated owing to the present circumstances, the meeting was in every way successful, for the proceedings all through were followed with the closest attention.

The members were welcomed at 9.50 a.m on the 13th by the Deputy-Master, who in his short address voiced the feelings of all present by expressing the deepest regret at the absence of the Master and of the Past Master. The Congress then unanimously resolved that telegrams to this effect be sent to Mr. Stephenson and Mr. Doyne, which was accordingly done.

The discussion, the title of which was "The Relationship of Ophthalmology to General Medicine," was then opened by Sir William Osler, the Regius Professor of Medicine of the University of Oxford, who dealt with the subject from a clinical point of view instanced by cases which emphasized the importance and value of ophthalmoscopic data in arriving at both diagnosis and prognosis.

The President of the Ophthalmological Society of the United Kingdom, Mr. Walter H. H. Jessop, followed with an interesting contribution in which he dwelt on the exactness of the science of ophthalmology. The value of the ophthalmoscopic signs in diseases of the kidney were undoubted and the data obtained from the observation of cases of trench nephritis, of which he had seen a great number, showed that the retinal changes were of toxic origin, and threw light on the nature of similar changes in other forms of nephritis.

Captain Adams contributed a valuable paper on the importance of retinal hæmorrhages from a prognostic point of view of life. His observations were based on the evidence afforded by following up 150 cases which had presented themselves for examination on account of hæmorrhages in the retina for various causes.

Dr. F. E. Batten dealt with the association of familial disease of the nervous system and of the eye, with especial reference to a form of cerebral degeneration associated with changes at the macula seen in several members of a childship.

Mr. J. Gray Clegg, Dr. Tyson, Mr. J. Hern, and Captain Stack followed.

The address of Sir Anderson Critchett, who opened the discussion in the afternoon, was interesting from beginning to end, and by no means required the kind forbearance which he threatened would be necessary. It contained many anecdotal reminiscences, some of them being of the older school of ophthalmologists, many of them amusing, and all calculated to impress on the minds of his listeners the value and necessity of complete co-operation between physician and ophthalmic surgeon.

Mr. Harrison Butler thought that the prognosis of life in cases of albuminuric retinitis was probably less grave than is generally held, and that with regard to the decompression operation in cases of papillœdema due to intracranial tumours, the high mortality in those of which he had had experience had forced him to the conclusion that the procedure was one not to be lightly undertaken.

Mr. A. J. Ballantyne noted the comparative rarity in his experience of the typical retinal changes around the macula in albuminuric retinitis, and referred to the not infrequent presence of a definite neuritis.

Mr. Jameson Evans dwelt on the conditions found in the eye secondary to toxæmia of dental, sinus, and intestinal origins, and regretted that more help was not forthcoming from those who specialised in those regions, notably of the sinuses.

Mr. Deighton-Davies followed.

In their unavoidable absence, the papers of Dr. James Taylor and Dr. H. Macnaughton-Jones were read. The former presented the "Variations in the Clinical Course of Cases of Myasthenia," and the latter emphasized the importance of "The Ophthalmoscope in Gynæcology and Midwifery."

Proceedings on the second day of the Congress commenced with an address by Lieut.-Colonel R. H. Elliot on the indigenous methods adopted in India for the treatment of ophthalmic diseases. His remarks, both interesting and amusing, were illustrated by lantern slides.

The contribution by the Master on "The Diagnostic Value of Tubercle of the Choroid," which, in his absence, was read, met with a hearty reception.

Mr. Stephen Mayou showed lantern slides illustrating tumours of the eye and orbit. By depicting each case from the general appearance of the eye and orbit to the macroscopical and microscopical appearances of the growth, an excellent idea was obtained of three extremely interesting tumours.

Mr. Harrison Butler showed some excellent lantern pictures of spring catarrh and offered some remarks on each, and also gave a paper on the results of squint operations, which gave rise to some discussion.

During the morning a resolution was brought forward by the Hon. Secretary to the effect that the Congress were of opinion that "All workers exposed to danger from flying particles, with especial reference to those engaged in munition factories, should be provided with and encouraged to wear suitable protective goggles."

After some discussion, the resolution was unanimously passed.

The afternoon was spent at the Eye Hospital, where a large number of interesting and instructive cases were shown by Captain P. H. Adams, Messrs B. H. St. Clair Roberts, and Harrison Butler.

Mr. St. Clair Roberts made some remarks with reference to his cases of glass-blowers' cataract which had occurred in chain makers.

Mr. E. Wood White showed new capsular forceps which had proved very useful in his hands; and Mr. F. Sydenham described his modification of West's operation for the treatment of dacryocystitis.

The scientific proceedings then concluded with a demonstration at the

Ratcliffe Infirmary by Major W. J. Turrell, R.A.M.C. (T), of the electrical treatment of warts and nævi, etc.

The Scientific Museum, which was open throughout the meeting, contained some excellent demonstrations amongst which the large and valuable collection of paintings illustrative of tubercle of the choroid by Mr. Sydney Stephenson, attracted special attention, together with those showing fundus conditions in various diseases by Mr. A. J. Ballantyne.

Dr. F. W. Edridge-Green gave demonstrations on binocular vision and various subjective phenomena connected with the retina and their explanation in the theory of vision.

Mr. J. A. Menzies, demonstrated the value of the Simpson light in the treatment of scar tissue in the cornea, and showed three patients, in one of whom a very satisfactory result had been obtained.

Pathological specimens ware shown by Captain P. H. Adams, Messrs. J. Gray Clegg, A. J. Ballantyne, Norman Pike, and B. Cridland.

The Commercial Museum was given room in the same building, affording good opportunity to examine new apparatus and instruments.

At the conclusion of the Discussion on Thursday, the Deputy-Master and Mrs. Adams entertained the members with their friends to tea at 53, Broad Street, and a number of visitors were present.

The official dinner was held in the Hall of Keble College, at 8 p.m., on Thursday the 13th, under the presidency of the Warden, the Rev. Dr. Lockė. Short speeches were made by the Chairman, the Deputy-Master, Mr. W. H. H. Jessop, Surgeon-Major General Sir F. Bradshaw, K.C.B., and Lt.-Col. R. H. Elliot.

In replying for the Congress, Captain Adams expressed his deep regret at the absence of the Master and Past Master, and his sincere wishes for their future health, a toast which was acknowledged by all present.

The weather, though not very propitious, was fine enough not to interfere with, what may be regarded, under the circumstances, as an interesting and enjoyable Congress.

B. C.

NOTES AND ECHOES.

Deaths. WE regret to announce that Dr. Ole B. Bull, of Christiania, died on April 10th last, aged 73 years. This artistic ophthalmic surgeon came from a family which has given many noteworthy men to Norway, especially to her art and science. It was especially the normal and pathological physiology of the eye which interested him and inspired his best work.

In the summer of 1871, and the following year, Bull held the State Scholarship to study eye diseases in lepers in Bergen. The result was a short but excellent work by him and Armauer Hansen: "The Leprous Diseases of the Eye," Christiania, 1873. In a clear clinical description Dr. Bull distinguishes sharply between the specific leprous diseases of the eye and those which are the result of injuries in n trigeminus and n. facialis. Chromolithographs after Dr. Bull's excellent water-colours increase the value of the work considerably. The pathologic anatomical illustrations also are probably due to Dr. Bull. These are of particular interest, for here are seen the brown globes, in which Dr. Hansen next year discovered the *Lepra* [illegible]

From [illegible] to 1881 Bull was first assistant at the University [illegible]

Clinic in Christiania. Here he examined the fundus of all the syphilitic patients and discovered the specific neuroretinitis of the early secondary stages of the disease. Dr. J. L. Bidenkap, the then head of the Clinic, did not use mercurial treatment. Dr. Bull's monograph on this subject, "The Ophthalmoscope and Lues," Christiania, 1884, with twelve coloured pictures of the fundus and twenty diagrams of visual fields, was a fundamental work, which would certainly have been more known than it is if it had been published in another and a greater country.

The same may be said about his "Chromatoptometriske Tabeller," Christiania, 1882, with text in Norwegian, English, French, and German. It is the most rational table for a quantitative examination with pigment colours of the central sense of colour (C), and is very useful in the diagnosis of central scotoma in tobacco amblyopia and retrobulbar neuritis. It is hardly possible to realise what great and unselfish work Bull devoted to this table. After colour equations with Maxwell's disc, he himself painted the fifty cartoons, of which two squares in each of the ten series of the table are cut out. The then art of reproduction could not master the task, which would probably be impossible even to-day.

Dr. Ole B. Bull.
1907.

To discover defects in the visual field he chiefly used *grey* objects of a certain degree of saturation ("Perimetrie," Bonn, 1895); in this work as well as in the following he showed the connection between defects in the visual fields and diseases in the vessels of the retina, "*Krankheiten der Retinalgefässe*," Leipzig, 1903, with forty-one diagrams of visual fields and thirty pictures of the fundus well reproduced in colours.

His "*Studien über Lichtsinn und Farbensinn*" in von Graefe's *Archiv für Ophthalmologie*, Vol. XXVII (1881), must be especially mentioned. He gives in this work a wealth of observations.

In the eighties Dr. Bull proved that some of the pupils of the schools for idiots were not idiots at all. They were only deaf and dumb. These pupils had till then paraded as fine results of the teaching of idiots. He has left original pictures to a whole atlas of diseases of the tympanum; these, as well as his ophthalmological pictures, now belong to the University of Cambridge.

Dr. Bull's great artistic skill also showed itself in the landscape water-colours, which he loved to do in his holidays. He had also great gifts as a sculptor, and spent many leisure hours at the cavaletto, modelling portraits.

It is a matter of course that these artistic interests to a high degree contributed to stamp his personality. He said sometimes that he would have preferred the career of an artist.

But we ought not to complain that he preferred science, which owes to him important and lasting observations. DR. S. HOLTH.

The well-known ophthalmic surgeon, Lyman Ware, of Chicago, has died at the age of 75 years. We hope to publish some details of the life of this distinguished man later.

Paul H. Römer died on March 30th of typhus contracted on the Eastern front. His research work is widely known in ophthalmology.

The world is all the poorer by the recent loss of Sir Victor Horsley, the famous English surgeon, at the age of 59 years, and of Professor Elie Metchnikoff, the equally famous Russian pathologist, aged 71 years. The former is well-known to every ophthalmic surgeon by reason of his work on "The operative treatment of optic neuritis," published in these columns in September, 1908. Sir Victor summarized the position as follows:—1. That all cases of optic neuritis should be relieved as soon as possible by operative treatment. 2. That such operative treatment, in the absence of other indications, should be the opening of the sub-dural space in the temporal or sub-tentorial region. 3. That the physician or surgeon in charge of a case must be held to be responsible for consequent blindness if the neuritis be not treated as soon as detected. As for Metchnikoff, he has gained something very like immortality by his views that the leucocytes are the main defensive agencies of the body.

* * * *

Appointment.

G. A. BARROW has been appointed anæsthetist to the Manchester Eye Hospital.

* * * *

The Blind Asylum, Edinburgh

THE Royal Blind Asylum and School, Edinburgh, has now entered into possession of Newington House, which is to be used as a hostel for Scottish blinded soldiers and sailors. Provision is there made for thirty men. It is believed that the number completely blinded is at present about 200, but the directors of the school have kept in view the fact that there would be hundreds of men who, though not totally blinded at first, would eventually become wholly blinded unless kept under constant observation for some time by specialists.—*British Medical Journal*, July 8th, 1916.

* * * *

A Miracle of British Industry.

MR. F. KELLAWAY, M.P., speaking recently at Bedford, described how, in the earlier days of the war, the British Army was out-munitioned owing to the activity of the Kaiser as "a glorified commercial traveller for Krupp's" and went on to tell how Great Britain had counteracted this initial advantage. Thus, of the 4,000 controlled firms now producing munitions, 95 per cent. had never made a gun shell or cartridge before the war. Ninety arsenals had been built or adapted. Our recent bombardment of the German trenches exceeded anything the German gunners had ever accomplished, and we are not yet at the full flood of our output of guns or shells. There were 184,000 women engaged in war industries in 1914. To-day there are 660,000. One of the most remarkable facts mentioned by Mr. Kellaway was concerned with the production of optical glass. British scientists had discovered many of the formulæ employed by the Germans in the production of optical and chemical glass. Within a year of the outbreak of war the output of optical glass (needed for gun-sights, periscopes, etc.) at home was multiplied 4½ times. Now it has been increased by 14 times and by the end of the year the increase will be twenty-fold.

* * * *

The Colorado Ophthalmological Congress. THE second meeting of the Colorado Ophthalmological Congress, which is based essentially upon the Oxford Ophthalmological Congress, will be held in Denver on August 1st and 2nd next. Secretary, Dr. W. H. Crisp, Metropolitan Building, Denver, Colorado.

* * * *

Golf Balls. WE gather from our contemporary, *The Ophthalmic Record*, that a verdict of $2,400 has been rendered against a firm of manufacturers of golf balls in Newark, N. J., as a result of the destruction of an eye from the acid contents of a ball.

* * * *

The Heidelberg Congress. IT is announced that the Heidelberg Ophthalmological Congress will hold an extraordinary meeting at Heidelberg on July 31st and August 1st next.

* * * *

The Hungarian Ophthalmological Society. ON June 11th the Hungarian Ophthalmological Society held a special meeting at Budapest to discuss eye questions connected with the war.

* * *

ORANJE BOVEN

German Oculist, trying on spectacles. "What do you read now?"

Dutchman. "Deutschland uber Alles."

German Oculist. "That is right, that pair exactly suits you."

"Oranje Boven" is the Dutch cry which answers to the German "Deutschland uber Alles."

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ORIGINAL COMMUNICATIONS.

VARIATIONS IN THE CLINICAL COURSE OF CASES OF MYASTHENIA.*

BY

JAMES TAYLOR, M.D., F.R.C.P.

LONDON, ENGLAND.

SOME years ago I hazarded the suggestion that it might be possible to divide cases of myasthenia into at least two distinct groups according as the disease ran a slow and chronic course, or an acute and rapidly fatal one. Anyone working at an eye hospital has probably more frequent opportunities of observing cases of myasthenia than are offered elsewhere, for a large proportion of the patients first seek advice on account of some ocular defect—either ptosis, or diplopia. Among the cases I have had the opportunity of seeing at Moorfields in recent years—through the kindness of my surgical colleagues—several points have been observed, which, while not clearing up materially the mystery with which the disease is surrounded, have been such as to modify considerably one's conception of the clinical course of the illness.

The following is a good example of what I would venture to name the chronic form of the disease:

W. S., a house painter, was sent to me by Mr. A. S. Morton, in 1901. There was a history that he had had drooping lids and double vision five years before this. He had suffered from lead poisoning with drop wrist. When I first saw him, he had double ptosis, more marked on the left than on the right side, and all ocular movements were much impaired. This impairment varied from day to day. There was also constant weakness of the arms, especially of the extensors of the wrist, but this also varied in degree. The muscles of mastication were weak and easily exhausted, and there was at times difficulty in swallowing. He was able to walk only a short distance, but after a rest, was able to proceed a little further. There was characteristic myasthenic reaction in the arm muscles.

This description applies to his condition on the various occasions in the last fifteen years in which he has been an in-patient at Queen Square. He always improved with the rest and good surroundings in hospital, but drugs seemed to have little effect on the condition, although strychnia, he thought, always helped him. While he was not in hospital he was often very helpless, he said, practically unable to walk, and often only able to feed himself with difficulty. On the whole, his condition has not undergone any permanent alteration in all those years

The following is in contrast to the foregoing, so different in its course as to seem to be a different disease.—M.D., aged 24 years, sent to me on 26th October, 1908, by Mr. J. B. Lawford, and admitted to Queen Square. She had one child aged seven months, and the history was that until three months before admission she was quite well. She went for a walk one day and was able to regain her home with difficulty. She actually fell down and was unable to rise without help. Next day she was better, and did her housework and attended to her child, which she was suckling, but she was very tired. She continued doing her housework until two weeks before admission. During those two weeks she had been unable to get out of bed.

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* [illegible]

A few days after her first attack, she was unable to open her right eye. Since then there has been constant difficulty in this respect. The eye is closed in the morning, she is able to open it later, but towards evening it closes again. Seven weeks before admission, eating tired her. Since then this difficulty has persisted, and is greatest, with the evening meal. On admission, there was double ptosis—incomplete—and all the ocular movements were limited. There was great weakness of masseters and temporals, and all the limb movements were feeble. She was unable to walk. The myasthenic reaction was distinct in the limb muscles. She had repeated attacks of difficulty in breathing, and she died suddenly in one of these attacks on February 6th, 1909, three and a half months after admission. In this case a very large thymus was present.

Another case with remarkable clinical history was the following.—W. K., aged 29 years, came to Moorfields and consulted Mr. Arnold Lawson in September, 1911. He was referred to me, and admitted to Queen Square on 18th September, 1911. He had had diplopia for six weeks. After an attack of what was called "dyspepsia," he had ptosis on the left side, and three weeks later, on the right. On admission, there was double ptosis, more marked on the left side, and defect in all ocular movements. There was also weakness in the limbs, but all reflexes were present. There was nothing in his previous history to connect with his illness. He was a total abstainer and a moderate smoker, and lived a healthy life in the country.

In hospital he became gradually worse. The weakness in the limbs increased, so that he became unable to walk and even to feed himself. The muscles of mastication became affected, and he could take only liquid or semi-liquid food, and even with that there was often great difficulty in swallowing. Finally, in spite of varied treatment, he became gravely ill: so ill that, although he was most anxious to go home, I strongly urged him against going, as I considered the risk very great. He went home, however, on 28th February, 1912, five months after his admission. He began after a time to improve slowly, and now he is able to walk well, cycle a little, and, although he is unable to do very hard work, he is being " badgered " by the military authorities to join the army.

This has seemed to me a very remarkable case, and I do not think that anyone who saw him when he left the hospital expected him to live more than a few days.

The following case, sent to me by Mr. J. H. Fisher in October, 1915, is of considerable interest from another point of view:

C. H. L., aged 33 years, had influenza at the beginning of 1915. He was in bed for ten days, and off duty (railway constable) for five weeks. Four or five months ago he had double vision, and he describes his vision as still "smeary" in walking about, although it is better than it was. He now complains of weakness in his legs. His vision is 6/60 in the right, 6/9 in left. The ocular movements are impaired, and the right eye is usually in a position of divergence. In all extreme positions nystagmic jerkings are produced. There is some degree of ptosis. The impairment of ocular movements varies in its degree from day to day, and even at different times in the same day, and this is true also of limb movements. The interesting and unusual complication in his case is the impairment of vision in the right eye. The optic disc in this eye is distinctly pale, and there is a central scotoma for colours. There is no sugar in the urine, but he smokes half an ounce of tobacco a day. I am of opinion that the impairment of vision and central scotoma with pallor of disc are no necessary part of the myasthenic condition, but are the result of tobacco poisoning. Tobacco amblyopia affecting one eye must be rare, although I believe it has been described.

These cases, all of which I regard as myasthenia, are strangely different—not so much in the clinical phenomena as in their clinical course. They do not, as I have said, help to dispel the mystery surrounding this disease; but I venture to think that all of them lend support to the view that the condition of myasthenia is determined by some toxic agent, and that the variations in the condition are determined by the amount of poison present in the blood at certain times. The source of this poison, and the manner in which it is got rid of, remain obscure.

The first case is extremely chronic, and when the course is so prolonged one cannot but suspect that some changes would be detectable in such a case in the cells of the ocular nuclei. Yet the almost complete, although temporary restoration of power which occurs in the ocular muscles, in even such chronic cases, make such a supposition difficult to maintain. The second case is a characteristic one of the severe and rapidly fatal variety of the disease. The third is extraordinary in the fact that such remarkable improvement—practically complete restoration to health—has taken place from a condition of such severe illness that death seemed to be impending; and the fourth is certainly unusual in the complication of myasthenia with toxic amblyopia. It may, of course, be urged that the condition in the right eye is not one of toxic amblyopia, but is the result of a retrobulbar neuritis; but in either case it can scarcely be regarded as anything but an unusual complication of the myasthenic condition.

DIAGNOSIS IN UVEITIS.*

BY

EUPHAN MAXWELL, M.B., F.R.C.S.I.,

ASSISTANT SURGEON, ROYAL VICTORIA HOSPITAL, DUBLIN, IRELAND.

First Part.

I PROPOSE to divide this lecture into two parts. In the first I will briefly survey such methods of diagnosis employed in clinical and scientific investigations on inflammations of the uveal tract as I have been able to find in the literature; in the second part, I will deal with my own work on the subject during the past year.

Before commencing this survey of the diagnostic procedures, it will be as well to give a classification of the varieties of uveitis.

The classification I have adopted is—with some additions—that of G. E. de Schweinitz, as stated at the International Congress of Medicine in 1913 (35). He states that infection may be ex- or endogenous, that it may be bacterial or toxic.

Endogenous infections may be classified as due to certain groups of diseases.

1. Constitutional diseases or disorders of metabolism—as gout, rheumatism, diabetes.

---

* Mary Louisa Prentice Montgomery Lecture, delivered in the School of Physic in Ireland, on [illegible]

2. Specific infectious diseases—as tuberculosis, syphilis, gonorrhœa, influenza.
3. Blood diseases—as anæmia.
4. Renal disorders and anomalies of urinary secretion—as nephritis, lipæmia, oxaluria.
5. Auto-intoxications—as in intestinal disorders, menstrual disturbances, detachment of retina (17).
6. Local diseases and infections—as in the rhinopharynx, tonsils, teeth, accessory sinuses, skin, etc.
7. Sympathetic ophthalmia.

With this classification as a guide, we may now consider the various diagnostic measures that might be adopted in any given case. The order in which these measures are considered has, of course, no bearing on their merits.

The first one I mention is that in which we try to gain information as to the cause of the uveitis from the clinical signs and symptoms of the patient.

The appearances and course of the disease in the eye itself are rarely of much diagnostic value, indicating as they do the severity of the attack but not its cause. Exceptions to this are the condylomata and yellowish-grey nodules, which are at times present in the uveal tract affected by syphilis or tuberculosis respectively. Their presence aids diagnosis ; their absence is valueless.

Possibly, also, we may take as an exception the well-known clinical course of sympathetic ophthalmia, which, although it gives us no clue as to the causal agent, enables us to diagnose the condition.

On the other hand, an accurate observation of any clinical features which the patient presents elsewhere in his body is of the greatest diagnostic value. If a patient with chronic empyema of the antrum of Highmore develop uveitis, the evidence is strongly in favour of the latter being due to the causal organism of the empyema, which evidence is corroborated if the cure of the antrum disease stays the course of the uveal inflammation.

The second diagnostic measure to be considered is that in which the cause of the inflammation is sought locally—either histologically or bacteriologically in uveal tissues or aqueous humour.

As regards an examination of the tissues, sections of an excised piece of iris may often give valuable first-hand information, while sections of an enucleated globe may give valuable presumptive evidence as to the condition of the other eye.

Fuchs successfully employed the anatomical evidence in classifying uveitis into types (17). As a rule, however, it is useless as an aid to the determination of the cause, except when tubercles are met with in tuberculous uveitis (28), gummata in syphilitic cases (28), or cysts in the retinal epithelium of the iris, apparently a very constant feature in diabetic uveitis (17), (28).

On the other hand, the bacteriological findings in the tissues are of the greatest value, as they may show us an organism, which, if not the sole cause, is presumably one of the causes of the inflammation. Most of the well-known pathogenic organisms have been found in different uveas (27). Besides this direct examination of the tissues, much useful information can often be gained by their inoculation into animals.

Passing now to the bacteriological examination of the aqueous humour, an examination much more readily performed than that of the uvea, we find that many and various organisms have been discovered therein.

The negative findings, however, far outnumber the positive ones in chronic cases, and this has been brought forward by some as an argument in favour of the theory that most of these cases are toxic in origin, rather than directly bacterial (5a), (17). Into this debatable ground, however, I will not trespass.

The third diagnostic measure, the importance of which in late years has been much brought before the notice of ophthalmologists, is a routine bacteriological examination, in otherwise obscure cases, of the blood, urine, fæces, and mucous membranes.

The fourth is a cytological examination of the blood. This procedure is frequently carried out as a diagnostic aid in suspected cases of sympathetic ophthalmia. Many observers claim to have found an increase in the large mononuclear leucocytes in this condition; this increase, they consider, is highly suggestive of the causal agent being a protozoon (6), (9). Others, on the contrary, have not verified this observation (14), (28).

The fifth diagnostic measure comprises the chemical examination of the urine, fæces, and gastric contents. Such an examination may prove of special help in cases of uveitis where gastro-intestinal auto-intoxication is suspected. The test for indican in the urine is one which has received much prominence in this connection (35). Elschnig is one of the warmest supporters of its diagnostic value, but von Hippel and others have failed to verify his claims.

Under the sixth heading I propose to place the numerous immunity reactions employed in diagnosis. We must remember in this connection that in cases of disease produced by some specific organism, that this organism, known as antigen, calls forth a corresponding antibody. These antibodies form the basis of immunity.

I purpose, first, briefly to survey the methods of search for these antibodies in the blood, or, more rarely, aqueous humour; secondly, the methods of search for physico-chemical changes in the blood, indicating the inter-action of an antigen and its specific antibody; and, lastly, the anaphylactic reactions.

Before commencing a review of the diagnostic measures in the first group, it is necessary to consider briefly the question of the site of formation of antibodies. A vast amount of work still remains to be done before this can be definitely settled. However, most workers in the field are of opinion that an infection, whether local or widespread, usually produces a general cellular activity, mainly in the hæmatopoietic organs, resulting in the formation of antibodies circulating freely in the blood-stream (2), (20), (22). Their presence, therefore, in the blood would give no information as to whether their production had any connection with an existing uveitis.

At the same time it is not disputed that a certain amount of local production may occur. Conjunctival immunity, for example, has been definitely proved (2), (34a). The question of uveal immunity is still undetermined (34a), (36).

It is quite conceivable that a local production of anti-bodies may take place, more especially in cases of primary uveitis, or of metastatic uveitis, in which the original infection has subsided. Could this be proved, the detection of antibodies in the aqueous humour in such cases would prove of the greatest diagnostic value.

It must be remembered, however, in connection with this local detection of antibodies, that, according to many observers, the healthy ciliary body allows their penetration from the general circulation in minute quantities. This permeability is greatly increased if the ciliary body be inflamed or in any way irritated (33), (13), (26), (37), (28), (34a, b), (8), (2).

It is thus obvious that in cases where antibodies have been detected in the aqueous humour, their presence should also be sought for in the blood if the diagnostic value of local detection is to be maintained.

The simplest antibodies known are the antitoxins which are capable of uniting with and thus neutralising their specific toxins. In various kinds of therapeutic and experimental work the detection of a toxin, or conversely, of an anti-toxin, by this method of neutralisation is much employed. As an aid, however, in clinical diagnosis, it is not used.

The second order, according to Ehrlich, comprises the agglutinins and precipitins, bodies of a more complex nature. Agglutinins are detected by their power of causing bacterial clumping, and tests founded on this property have proved of the greatest aid to diagnosis, especially in cases of typhoid, Malta fever, bacillary dysentery, and cerebro-spinal meningitis (22). Precipitins are detected by their power of causing precipitation of bacterial, or other foreign albumens, against which they have been developed. The method of precipitation is not employed much in clinical diagnosis owing to difficulties of *technique.* It should be mentioned here that it has been used in researches on sympathetic ophthalmia. If Elschnig's view be correct, that the broken-down uveal tissue of the first eye causes a toxæmia resulting in a depression of the second eye, then it is conceivable that antibodies are in the blood in cases of sympathetic ophthalmia, capable of precipitating uveal albumens. The results obtained with above tests are not, however, convincing (34a), (36).

Thirdly, we have the amboceptors ; antibodies still more complex in their action. Ehrlich conceives these as uniting, on the one hand, with the antigen ; on the other, with complement. The latter, naturally present in the blood serum, is probably of the nature of a ferment, and, according to Bordet, thus causes digestion of the antigen (22).

The presence of amboceptor can be most readily detected by the " fixation of complement " method, the details of which will be explained later.

This method, using the suspected causal organism as antigen, has been employed as a diagnostic in many clinical diseases, with varying, but, on the whole, encouraging, results (22), (24), (32). It has also been employed, using uveal emulsion as antigen, in investigations on Elschnig's theory of sympathetic ophthalmia. The results in this connection would seem to be too much at variance with one another to be of practical value (12a, b), (36), (31), (34a).

According to some observers, opsonins, antibodies which decrease the resistance of an invader to ingestion by phagocytes, are to be regarded as complement and amboceptor working together (22). The examination of the opsonic power of a patient's blood may be, in the hands of skilled workers, a valuable aid to diagnosis (7), (8). The difficulties of its *technique*, however, have prevented its more widely spread application (2).

The next antibodies for consideration are the antiferments and the protective ferments. The best known reactions for their detection are those of Wassermann and Abderhalden. A positive " Wassermann " is due to the presence of what is probably an antilipoid ferment, produced in response to, in the great majority of cases, the toxic action of the syphilitic spirochæta on the lipoids of the body cells. The test is also carried out by the " fixation of complement " method, and is one of the greatest value in determining the active presence of the spirochæta pallida (22)

Abderhalden's reaction depends on the assumption that proteids, native or otherwise to the body, but in both cases, foreign to the blood, when introduced into the circulation will cause the production of specific protective ferments. He claims to be able to detect these *in vitro* by his dialyzation and optical methods.

The first is performed by placing the proteid antigen and the suspected serum in a dialyzing capsule. If the serum contain a specific protective ferment, the proteid will be split up into peptones and amino-acids. These smaller molecules dialyzing into a surrounding fluid can be detected by a colour reaction.

The optical method is performed by observing the increased rotation of light taking place in a fluid in which a specific interaction has occurred.

The test has been performed in, amongst other diseases, syphilis, tuberculosis, acute infections, and sympathetic ophthalmia. The specificity of the reaction has not been definitely proved (22), (18), (21), (16), (5b).

In the second group for the detection of physico-chemical changes in a fluid containing antigen and its specific antibody, we find in addition to Abderhalden's reaction the following two tests:—

The first is the so-called "epiphanin" test, elaborated by Weichardt, It depends on the fact that diffusion is accelerated if antigen and its specific antibody are brought together. It has proved very successful as a diagnostic in syphilis (22). It has been employed with varying success, using uveal tissue as antigen, in researches on sympathetic ophthalmia (34a).

The second test is the "meiostagmin" reaction, elaborated by Ascoli. It depends on the fact that surface tension is reduced by the interaction of antigen and its specific antibody. Its employment as a diagnostic would would appear to have met with varying success (22), (30).

Simplification of the *technique* of both these reactions must be looked for before they can be admitted to be of practical diagnostic value.

Finally, there are the anaphylactic reactions. These all depend upon the fact that an individual who has already been infected will, on receipt of a second similar infection, promptly exhibit reactive symptoms, local or general. These symptoms are supposed to be due, according to Vaughan's widely accepted theory, to the rapid action of the previously produced antibodies on the foreign proteid, resulting in its cleavage, and so liberating toxins.

The best known of these reactions are those employed in the diagnosis of tuberculosis and syphilis.

Among the tuberculin reactions, the subcutaneous test with general symptoms, especially a rise in temperature, as its positive sign, is that most generally employed in ophthalmology. The intra-cutaneous test is, however, thought by some to be more sensitive (22).

In syphilis, the employment of the luetin test, carried out by an intra-cutaneous injection of killed spirochætes, and resulting, if positive, in a local reaction, is of the greatest value in diagnosing not only the active presence of syphilis, but, for some time after its cure, the fact of its previous existence.

The value and number of these reactions as practical diagnostic measures are on the increase (22).

(*To be concluded.*)

LARGE TRAUMATIC HÆMORRHAGES OF THE VITREOUS.*

BY

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MY purpose in bringing this subject forward is to direct your attention to the problem of the absorption of blood, and to endeavour to obtain the views of those of you who have thought on this point and who have had experience in dealing with the subject.

With regard to vitreous hæmorrhage, as far as literature treats it, it does so from an ætiological standpoint, and is mainly concerned with the cases of retinal and vitreous hæmorrhages as the result of pathological conditions, such as Bright's disease, arterio-sclerosis, etc., or else in those cases of recurrent hæmorrhage into the vitreous found in young adults.

A considerable number of cases of injuries to the inner vascular structures of the eye have occurred during this war, resulting in large hæmorrhages into the vitreous chamber. We have, however, in these military cases no pathological factor to distract our attention from the one simple point, *viz.*: how to effect an influence on a mass of blood, not, of course, large in an absolute sense, but very large in relation to the size of the cavity involved, as the whole vitreous chamber seems sometimes quite full of blood. The ætiological factor is, of course, traumatic, and for the rest we have healthy ocular tissues to deal with.

If we could discover any means by which these hæmorrhages could be rapidly and entirely absorbed, we might secure greater visual power for the patient than if we left the blood quite alone to coagulate and to become organized. That blood is absorbed is not in dispute, but the exact means by which this can be brought about is, to some extent, a matter of controversy, according to whether we view the subject from an entirely physical standpoint or from the vitalistic; and until some agreement is arrived at as to the real method by which absorption is induced, we cannot influence satisfactorily and completely the procedure Fluid exudations are, no doubt, removed by the lymphatics and blood-vessels, but the process by which the solid portions of the blood are got rid of is more difficult to follow.

Blood is not absorbed as such, it is changed; and when in the vitreous chamber it is thrown out in quantity, some of it, no doubt, undergoes coagulation. It is probable that when after some months one can see a red fluid present in the vitreous, that it is really a mixture of serum and hæmoglobin, and that around this fluid mass there is some solid coagulated clot, in which fibrosis has more or less taken place. The solid portions are probably destroyed and carried away by leucocytes, as after severe hæmorrhage has taken place, a leucocytosis is often seen which may be well marked; the fluid part of the blood is absorbed by the lymphatics and blood-vessels. It must be allowed that absorption of some of the fluid is brought about in a physical and mechanical way, part draining away by the lymphatics, and part passing directly into blood-vessels. Starling and Tubby found on injecting colouring matter into the peritoneal cavity, that in about twelve experiments the colouring matter appeared earlier in the urine than in the lymph which flowed from the thoracic duct; consequently, in the case of collections of fluid in the serous cavities, there is reason to believe that the blood-vessels play a greater part than the lymphatics. All varieties of fluid are not absorbed at the same rate; watery solutions of crystalloids are absorbed with much greater rapidity than fluids containing proteid; in fact, pathological exudations in the serous cavities, if they contain a considerable amount of proteid, are often absorbed with extreme slowness or not at all.

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The question I should like discussed is: Can we influence the absorption of blood by either mechanical or chemical means? And further, can we, by delaying coagulation, prevent the formation of solid masses, the absorption of which is acknowledged to be difficult, if not impossible?

Vitreous hæmorrhages are due in most cases, when resulting from gunshot wounds, etc., to rupture of the retinal vessels, or the vessels of the uveal tract, the tissues themselves being in a healthy and normal condition previous to the traumatism. In my work at the General Hospital, I have had very many cases in which the vitreous chamber has been occupied by a large mass of blood. In all instances where the pupil is active, I have attempted treatment, and the results in some cases have been gratifying. Where the results have been disappointing have been where we have found subsequently that large ruptures of the choroid and retina were present.

In examining these cases of extensive vitreous opacity, it is often found that the whole of the chamber in front of the lens is quite clear, the hæmorrhage appearing to be confined to the vitreous chamber. From that we may argue that the blood is probably not in a fluid state, but that it is confined within the structures separating off the anterior from the vitreous chamber, the periphery of which after a time becomes clearer, and one is able to obtain a dull-red reflex which increases in extent as time goes on; but there always seems to be a much denser area below, and also, I think, in many cases a certain amount of blood is attached to the lens at its posterior pole and at its lower part. The cleared area extends itself, and, in many instances, the patient's vision improves sufficiently for him to see objects below him, and, by throwing his head back, he is able to get quite a considerable field of vision, but things set immediately in front and above him remain obscured. If now the amount of blood is considerable, organisation seems to take place, and the ocular reflex changes to a dense, white, soft mass which is quite impervious to light; this later causes some shrinking of the eye, and, subsequently, may render the organ useless for visual purposes.

Can we prevent this, or, if we cannot prevent it, can we diminish the amount of this organized tissue formation? Can we increase the amount which is absorbed? In fact, can we in any way influence the condition? If the eye is left entirely alone, small quantities of blood will absorb without any treatment at all; on the other hand, large vitreous hæmorrhages undoubtedly do become organized, shrink, and ruin the sight. These are the points upon which I think we should concentrate, and for which I should like to find some more definite solution.

As far as one can ascertain, the steps by which blood is absorbed follow this sequence: first, the fluid part is carried away by the lymphatics and blood-vessels; second, the solid constituents are removed by leucocytes, the red-blood corpuscles are destroyed and assimilated, the blood pigment being found subsequently in the surrounding tissue and in the lymphatic glands; and, lastly, the fibrinous coagulation remaining is invaded by fibroblasts which gradually convert the residue into fibrous tissue, which by its contraction further diminishes the volume of the exuded mass.

The means I have used to influence this condition may be tabulated thus: — (1) Massage. (2) Ionization. (3) Subconjunctival injections. (4) Removal of some of the fluid and its substitution by normal saline. (5) Fibrolysin. (6) Dionine. (7) Potassium iodide. (8) Radium.

(1) *Massage.*—I have, I think, come to the conclusion that mechanical means are the most hopeful.

The effect of early massage of fractures (a proceeding which was new in my student days, and which, as house surgeon to Sir Henry Howse, I used to practise) recurred to my mind as likely to be helpful, and I have received much valuable assistance from the massage department in treating these cases. Smoothing movements of the lids from the middle line outwards, both through the upper and lower lids, and direct gentle pressure on the globe through the lids, combined with rapid vibratory oscillations of the globe by the fingers are the movements most in use.

Simple massage, vibratory or pressure massage, all act by mechanically assisting the lymph and vascular circulation, the fluids are moved, thus the interchange normally occurring in the eye is increased in rapidity; this leads to an increase in the absorption of the fluid parts of the extravasated blood and also to an increase in the number of leucocytes coming to the organ, so assisting the destruction and removal of the solid parts.

(2) *Ionization.*—It is difficult to decide exactly what effect, if any, ionic medication can have until we are quite sure that the condition is influenced by some drug or by some mechanical agent. I have used iodide of potassium with the idea that iodine would be beneficial. But it is quite probable that iodide of potassium only acts by general effect and not by local means, and it is its influence upon the secretion of the thyroid rather than upon any local action that the benefits from the use of this drug are obtained.

Dr. Iredell, who has kindly carried out the treatment of many of these cases for me by means of ionic medication, has sent me the following statement of his methods: "In giving ionization to the eye, a pad about an inch square, made up of sixteen thicknesses of lint, was soaked in a 1 per cent. solution of the drug which was to be driven in. The eye to be treated was closed and the pad held against it by the patient himself by means of a metal electrode mounted in a wooden handle which was connected with a battery. A larger pad was placed on the back of the neck or arm and formed the indifferent electrode. The current was then turned on and gradually increased until the milliampèremetre registered 3, 4, or occasionally 5 milliampères. The treatment was continued for fifteen to twenty minutes, and then the current was gradually turned off. The drugs used were quinine (driven in under the anode), iodine (driven in under the cathode), and occasionally chlorine. The treatment was given three times a week, and, as a rule, was combined with massage. The patients complained of no discomfort."

I think that ionization has certainly been of value, but I rather suspect that its use is the result of a general action rather than of a local one.

(3) *Subconjunctival Injections.*—The action of subconjunctival injections has been theoretically explained on physiological grounds.

According to Wessely, they act by reflexly producing an intra-ocular vaso-dilatation.

Darier gives the following sequence of events as following subconjunctival injection.—(1) At first there ensues local irritation, due to removal of the aqueous humour through the canal of Schlemm and the spaces of Fontana from anisotonicity of the fluid. (2) This irritation, moreover, sets up hyperæmia of the ciliary body, and subsequently fresh secretion of aqueous humour rich in albumin and antibodies. (3) An isotonic equilibrium is thereby brought about which allows of the absorption of some of the substances injected which then act locally, according to their individual pharmacodynamic properties, as anæsthetics, mydriatics, lymphogogues, antiseptics, etc.

I have used subconjunctival injections of normal saline solutions in many of my cases; one injection following another at varying intervals, according to the amount of reaction produced; usually, they were able to be given every two or three days. If improvement occurred, they were continued; but if after ten or twelve injections no improvement was remarked, they were discontinued. As I did not use anything except the salt solution, and never dissolved any drugs in it, the improvement obtained was due simply to the physiological effect of increasing the local blood supply. If this effect does not produce an acceleration of the lymphatic flow, or an afflux of leucocytes, it is difficult to explain the improvement obtained. But according to Wessely, as quoted by Darier, its action is reflex upon the vessels of the ciliary body, which become dilated and allow of the transudation of a greater quantity of albumin, and consequently of antibodies of the most various kinds. If this is so, subconjunctival injections are likely to be of use only in chronic infective processes, and not as an aid to the absorption of an inert mass, such as blood. As I think, however, that subconjunctival injections have been useful, I am inclined to attribute the utility to mechanical causes only.

(4) *Removal of some of the fluid and its substitution by normal saline.*—Following some experiments published by Elschnig, of Prague, I have attempted in two instances to obtain benefit by removing from the vitreous chamber a small quantity of the blood-stained fluid and injecting a corresponding amount of 1 per cent. solution of hirudin in salt solution, the idea being that the hirudin would diminish the coagulability of the remaining fluid, and so enable absorption to go on longer. In both cases that I experimented on, the eyes were practically blind and the vitreous chamber was full of blood in a semi-fluid condition. I removed half a cubic centimetre and injected half a cubic centimetre of salt solution; the pain and chemosis following within a few hours made it evident that very much smaller quantities would have to be removed and inserted to make the treatment possible without serious risk of producing permanent inflammatory changes. The inflammatory signs, however, subsided without any marked organic lesions being noticed, but the improvement I obtained was not marked. Of course, two cases are not sufficient evidence on which to make a final and definite decision, and I think that if I should attempt it on a suitable case again, I should be content with removing only a few drops, as by that means the reaction would, perhaps, be very much less; although I think that even this would probably result in a considerable amount of pain being experienced by the patient, and I am not prejudiced favourably towards this method of treatment, in spite of the Prague recommendation

(5) *Fibrolysin.*—The only fact which seems to have been ascertained with regard to allyl-sulpho-urea or thiosinamine is, that it produced a great excess of leucocytes in the blood. This one fact, however, should make fibrolysin a useful aid in treating these cases of vitreous hæmorrhage, because, undoubtedly, the way in which the solid particles present in the extravasated blood are removed is by their ingestion, and not infrequently after extensive hæmorrhage, blood pigment has been found in the lymphatic glands, and also in the synovial membranes where the hæmorrhage has been into joints. We may take it as proved that the blood corpuscles are destroyed, and the blood pigment carried away by leucocytes; therefore anything that will increase the number of these scavengers will assist in the removal of the

refuse. As a result of the presence of extravasated blood within the eye, a slight amount of irritation is set up in the surrounding tissues; this, no doubt, leads to an increase in vascularisation in the surrounding tissues, leucocytes wander out from the vessels, absorb some of the fluid, become swollen up and degenerate; the pigment itself proliferates, so that we often see diffuse pigmentation of the tunics remaining after the hæmorrhage has disappeared. It is seldom, however, that the inflammation of these cases becomes sufficiently great to show any marked iritis, and any extra irritation of the globe is to be avoided at all costs, because it would probably produce further changes in the blood clot, and lead to an increased number of fibroblasts being present, thus accentuating organization.

(6) *Dionine.*—Dionine, when applied to the conjunctiva, produces a burning sensation, followed by lacrymation and fine injection of the vessels, often combined with diminished sensitiveness. On the ocular conjunctiva a fine web of lymphatic vessels becomes visible, and is gradually swallowed up by a more or less strongly developed chemosis, which often covers the corneal limbus by a sausage-shaped swelling; the lids swell to such an extent that they cannot be opened. This state reaches its maximum in about half an hour, when the œdema gradually lessens, to disappear in three, six, or even twelve hours. Luniewski injected some finely ground Indian ink into the vitreous of both eyes of a dog, and applied dionine to the conjunctiva of one eye only; forty minutes afterwards the dog was killed, and both eyes hardened in 4 per cent. formaline. As regards the dionised eye, it was found that (*a*) the current which carried the ink particles was quicker and stronger; (*b*) a venous stasis was set up; (*c*) the lymph stomata were widened; and (*d*) the lymph circulation in the anterior and posterior lymphatics was increased and accelerated. The interpretation of these facts is that there is an increase of lymph flow. Dionine, therefore, is a lymphagogue, and as such is capable of increasing interchange between the tissues; and for that reason probably has some value in increasing absorption.

(7) *Potassium Iodide.*—It is almost an axiom of medical therapeutics that iodide of potassium is an absorbent. When, however, one begins to investigate this statement, one finds very little experimental evidence to support it, and likewise a rather vague idea as to what it exactly means. Taken strictly, it should mean that pathological exudations, thickenings, and newly-formed connective tissue are affected by the taking of this drug, and that its use results in a lessening or a disappearance of the superfluous substances. How it acts, what is the exact way in which the salt produces this effect, is not explained, or the explanation is unconvincing.

It is said to be decomposed in the stomach and a sodium salt and an albuminate formed; these are absorbed into the blood with remarkable rapidity and may be recovered from all the tissues, especially the secreting glands. Iodine accelerates the metabolism of the plasma rather than of the tissue elements themselves.

It certainly influences among others thyroid secretion, and thyroid extract has a wonderful effect on young connective tissue. The results seen in myxœdema and cretinism of full doses of potassium iodide are due, probably, to the stimulation of the thyroid secretion resulting from the absorption of the iodine in this salt.

It is possible that the iodine present combines with the albuminous material in the blood clot and forms a soluble albuminate which is capable of being absorbed. Its use on account of its supposed absorbent properties is so ancient that we must admit that it is probably of value, although we are not in a position to say exactly how it acts.

(8) *The effect of radium on blood.*—The action of radium upon some of the main constituents of normal blood has been the subject of research work by Drs. Chambers and Russ. They conducted experiments with a view to determine the effect of the different radiations of radium, and came to the conclusion that the *beta* and *gamma* rays, almost without exception, had no effect at all, but that the *alpha* rays had a hæmolitic action on red blood corpuscles, the hæmoglobin being gradually released from the corpuscles and oxy-hæmoglobin converted into methæmoglobin; also the white corpuscles degenerated under its influence, and in certain experiments the leucocytes appeared to move away from the area that was being influenced by the rays. Radium apparently has no selective activity, the difference in effect on different cells depending upon the varying powers of resistance offered by the tissues, and it is probable that epithelial cells being more highly differentiated and developed, would have less resisting power than the less differentiated connective tissue cells. From this it seems to me fairly clear that in using radium for the purposes of destroying fibroblastic cells present in organising blood clot, we must be very careful that we do not prejudice the cells of the corneal epithelium or the much more highly developed cells of the retina. I doubt very much if radium, on theoretical grounds, is likely to be of great value in these large hæmorrhages in the vitreous chamber, for it is obvious that any strength of *alpha* rays sufficient to destroy the newly-formed connective tissue cells present in the organizing clot, would at the same time be sufficient to destroy the more delicate cells present in the retina and in other parts of the eye. The effect of exposing the eye to radium for a long period is to produce a decided inflammation of the conjunctiva, and if this were continued, presumably the cornea, sclera, and tissues inside the globe would participate; but in the cases in which I have tried it I am not sure that when one has pushed the treatment to the extent of producing a superficial inflammation, one has even then obtained any appreciable effect upon the structures within the sclera. On theoretical grounds, therefore, one is not at all hopeful that radium is likely to produce any very satisfactory results; but I see no reason why it should not be tried, as theory and practice do not always coincide, and so long as care is taken, the effect is more likely to be negative than to be positive and harmful, and some benefit may still declare itself. As radium has a hæmostatic action, there is no objection to using it in the earliest stages, as soon after the injury as possible, and perhaps it is at that time when some benefit might be obtained; also the destruction of the red blood cells would in all probability render the blood more capable of absorption. In the late stages, however, when organization has commenced, radium may prove of value in preventing the fibroblastic cells from entering the mass and so delay clotting, leaving the blood still fluid, and consequently more capable of absorption.

Koster, at the International Congress of Medicine, stated that he had obtained improvement in cases of vitreous hæmorrhage by means of radium, and had found that radium had a hæmostatic action, so that he was able to use it in the early stages.

In conclusion, I should be extremely glad if any Member of the Society would, in discussing this matter, furnish us with any ideas which may have occurred to him as to the efficacy of these or any other means he may have tried in influencing the absorption of blood in the vitreous chamber. Owing to the difficulties of the subject, and to the small amount of time at one's disposal for carrying out any scientific investigation, I can only give a general impression of my results. Undoubtedly, in some instances hæmorrhage disappears entirely from the vitreous and from the retina in these traumatic cases ; but as every case has been treated in some way or another, it is difficult to be sure how much the result has been effected by the treatment, because in some instances in which the same treatment has been applied, very little improvement has taken place before organization of the blood clot has supervened.

Why some cases should show so much improvement, and others so little, is not, to my mind, quite clear. Whether it is due solely to the quantity of blood, or to the extent of the rupture, or its position, I am uncertain ; at the same time I feel convinced that in some of the cases treatment has been beneficial. With the exception of the indirect action of iodine, it is not clear to me that we have any drug, the presence of which undoubtedly benefits absorption ; massage, ionization, subconjunctival injections, and dionine owe their beneficial effect entirely, in my opinion, to mechanical causes. The removal of fluid, and its substitution by normal saline and radium, are, I think, of very doubtful benefit. Fibrolysin, possibly, by the production of leucocytosis, may influence matters ; but I think that mechanical treatment is not only the safest, but also the one most hopeful for the future.

PERIPHERAL LESIONS OF SHELL CONCUSSION.*

BY

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THE extensive employment of high explosives during the present war has been associated with the appearance of certain ill-defined and variable nervous symptoms, which are included under the designation of "shell shock." In some of these cases the special sense-organs are affected, some patients losing their sight, others their smell, taste, speech, or hearing, while others again may be deprived of the use of more than one of their special senses. Apparently, there is some disturbance of the cerebro-spinal system in general associated with the loss of function of the sense-organs, and the discussion of the pathology and psychology of these cases has already brought forth a considerable literature, which one of our most distinguished neurologists has stated will require a "brand new dictionary" for its proper appreciation and discussion.

It is not my intention, nor, indeed, have I the ability, to discuss the question of the psychology of "shell shock," but rather to examine the physical results of high explosives on the eye and its adnexa. I was much interested to read of cases of loss of sight from "shell shock," which suddenly recovered the use of their eyes owing to some intense excitement or shock, and I have been expecting to see similar cases among the wounded who come under my care. So far, however, I have not met with a single case of complete blindness (amaurosis), either monocular or binocular. Amblyopia of varying degrees has, on the contrary, been a frequent symptom ascribed to the effect of high explosive shells.

Out of some 450 ophthalmic cases seen at the 1st and 2nd Birmingham War Hospitals, and at the Birmingham and Midland Eye Hospital, I have notes of 50 cases of defective vision ascribed to "shell shock." These notes are by no means exhaustive or complete, as no attempt has been made to go into the general nervous symptoms; but as far as the ocular symptoms are concerned, there was no great reason for doing so, as, with few exceptions, the vision was either definitely or permanently lost from gross organic lesions, or "restored" so that the soldier could be sent back to duty. The treatment in all cases was by ordinary therapeutical or physical means, and no attempt was intentionally made to effect a cure by suggestive or hypnotic methods.

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*Presented to the Ophthalmological Society, May 6th, 1916.

The cases may be roughly analyzed as follows:—

Analysis of 50 *cases in which failure of vision was ascribed to the bursting of high explosive shells.*

Cause of the visual defect.	Number of cases.
Errors of refraction	13
Corneal lesions: nebulæ	5
" " keratitis or epithelial dystrophia	5
Conjunctivitis	5
Iridodialysis	1
Subluxated lens	1
Choroidal rupture	2
Retina: hole at the macula	2
" (?) thrombosis of the central artery	1
Optic nerve: hæmorrhage into sheath or nerve	1
" atrophy	2
Paralysis of the cervical sympathetic	1
Convergent strabismus (alternating concomitant)	1
Old-standing diseases (tabes, cataract, squint)	3
Normal eye	1
Doubtful cases, probably malingering, but possibly hystero-neurasthenia	6

It will be observed that over 25 per cent. of the cases were put right by correcting glasses. The corneal nebulæ were probably the result of injury by bits of soil thrown into the eyes by the force of the explosion. The keratitis without breach of the surface epithelium is more difficult of explanation, but it also may be due to injury by particles blown up, or gas evolved by the explosive. The disturbance of the corneal epithelium is peculiar. It appears crinkled or pitted, and I have not been able to decide whether the appearances are always the same. There is nothing peculiar about the conjunctivitis, beyond the fact that there is little or no discharge, but there is often marked photophobia and blepharospasm, which I am afraid are not always genuine. In two cases there was marginal blepharitis, which was ascribed to the effect of the gases. The iridodialysis and subluxation of the lens, in the absence of any sign of external injury, must be ascribed to concussion effects, unless we were misled by the histories given.

The same may be said of choroidal ruptures and holes at the macula. These men had been unconscious for some time after the explosion, and were unable to give a very definite account of what happened. The case of doubtful thrombosis of the retinal arteries (under the care of Mr. T. Harrison Butler) in which the arteries were represented by white cords, and with extensive hæmorrhages into the retina and vitreous, is unique in my experience, and I can offer no explanation of its ætiology.

The cases in which hæmorrhage into the optic nerve and optic atrophy were diagnosed showed swelling and yellow discolouration of the face when they regained consciousness. It is probable that this was the result of being buried under the displaced parapet, the weight of which would produce traumatic asphyxia, and this might also be responsible for the nerve lesion.

The case of sympathetic paralysis is exceedingly interesting.—The history was a clear one of air concussion, pure and simple, since the patient did not lose consciousness. He presented on the left side the complete syndrome of enophthalmos, ptosis, and contracted pupil, which did not dilate with cocain. The pupil reactions were normal. The left side of his face and neck was congested and warm, and was bathed in perspiration (Fig. 1). The slightest excitement caused a further increase of the secretion. He is said to have been deaf and blind immediately after the shock. His vision now is R.V.=6/6, L.V.=6/12. Left field contracted. He remains practically in the same state after four months' stay in hospital. X-ray photographs showed that the lesion was a subluxation of the 6th and 7th cervical vertebræ, whose transverse processes appear like small cervical ribs.

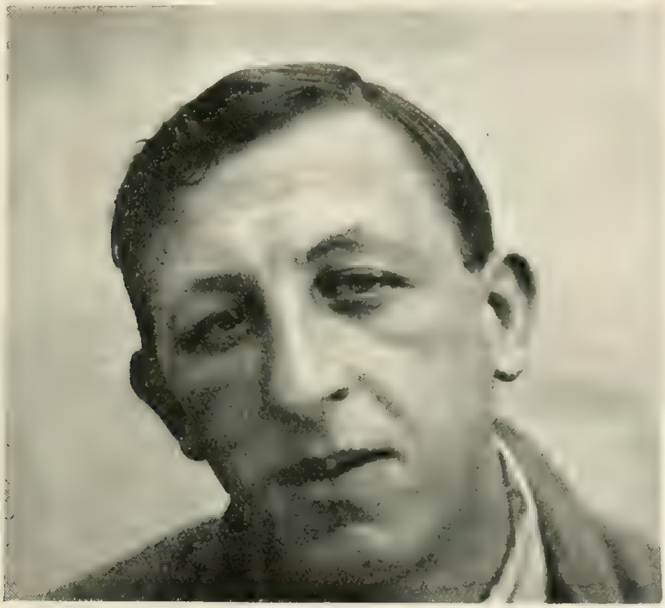

FIG. 1.
Left sympathetic paralysis with vaso-motor disturbance from "shell shock."
(Note the beads of sweat on the eyelid and lip.)

By a curious coincidence, I had at the same time another case of left-sided cervical sympathetic paralysis under my care. This man had a bullet wound of the neck at the level of the lower part of the thyroid cartilage. He has the same symptoms as the "shell shock" case but without the vaso-motor disturbance (Fig. 2). He also had temporary aphonia, evidently from injury to the recurrent laryngeal nerve.

The squint case was probably only the manifestation, through exhaustion or shock, of a condition which was previously latent.

The doubtful cases were all unwilling patients, and did nothing to facilitate the elucidation of their trouble. This fact favours the diagnosis of malingering, although, of course, it does not absolutely exclude the possibility of hysteria or neurasthenia. In only one case were there any general symptoms suggestive of neurasthenia. It is to be regretted that the general symptoms of hysteria and neurasthenia were not investigated to any appreciable extent, but the fields of vision were taken in a good many cases. Contracted fields were exceedingly prevalent, but they did not appear to be more common in shell shock cases than in cases which had not been exposed to high explosives. I was forced to attach very little value to restriction of the visual fields as an aid to diagnosis. Much more could, no doubt, be done to get at the root of many of these cases, but want of time, and the entire lack of equipment in the military hospitals, are my main excuses for the many shortcomings of these investigations.

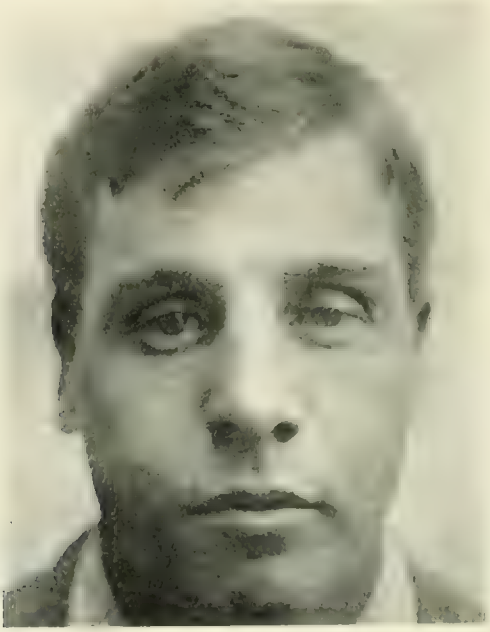

FIG. 2.

Left sympathetic paralysis from bullet wound of the neck.

So far as I have been able to ascertain, "shell shock" is not at the present time blamed for failure of sight as often as one might expect; but it is not unlikely that with the soldiers' increasing knowledge of its subtle possibilities, it will become a more popular means of getting a prolonged leave than, say, a backfire, a fall off a bus, glare of the sun, the whizzing of bullets, or typhoid inoculation. For this reason the discussion of the symptoms of shell shock in lay papers, or within hearing of patients in hospital, is to be deprecated.

I am very conscious of the shortcomings of this communication, but it expresses my personal experience of these cases, and, as far as that goes, it seems to me that, as a rule, the ocular symptoms of shell shock are generally due to peripheral lesions rather than to *commotio cerebri* or psychic trauma; but further experience may quite possibly lead me to change my opinion.

A CLINICAL STUDY OF FIFTY-FIVE CASES OF INTRA-OCULAR RETENTION OF FOREIGN BODIES, WITH RESULTS TWO YEARS AFTERWARDS.

(Continued)

BY

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I. Number of case	35.
II. Eye affected	Left.
III. Position and character of the wound	Penetrating corneal wound at nasal side.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Piece of metal embedded in iris behind wound
V. Visual acuity of injured and uninjured eye	Left : $\frac{6}{12}$. Right : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Anterior part of eyeball and iris.
IX. Magnet and other operations, and subsequent complications	Limbal section opposite foreign body, and extraction of scale (2 mm. × 1 mm.) by weak current with small magnet.
X. Results two years afterwards	Left : [illegible] Right : $\frac{6}{6}$. No complaint. Saved.

I. Number of case	36.
II. Eye affected	Right.
III. Position and character of the wound	Angular penetrating wound at upper and outer quadrant of cornea.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Piece of iris said to have been excised before admission, Lens cataractous.
V. Visual acuity of injured and uninjured eye	Right : [illegible]. Left : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself ...	Same day.
VII. X-ray plate...	Positive
VIII. Position of foreign body ...	Anterior part of vitreous.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Foreign body drawn into anterior chamber. Limbal section and extraction of scale (9 mm. × 4 mm. × 1 mm.). Prolapsed iris excised. Lens gradually became more opaque, but a month after dismissal, sight suddenly became much worse, when an extensive detachment of retina was found above and to outer side through hazy lens.
X. Results two years afterwards	Right : perception of light, Detachment of retina. No complaint. Left : $\frac{6}{6}$. Saved.

I. Number of case	37.
II. Eye affected	Right.
III. Position and character of the wound	Meridional penetrating scleral wound (3 mm.) below centre of cornea
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Penetrating wound of lid in front of scleral wound.
V. Visual acuity of injured and uninjured eye	Right: shadows Left: [illegible]
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Would not come into anterior chamber Extracted through original wound, slightly enlarged. Large chunk (6 mm. × 2 mm. × 2 mm.). Loss of vitreous. Scleral wound covered by conjunctiva Sub-acute iridocyclitis. Enucleated 11 days after injury
X. Results two years afterwards	Left: $\frac{6}{6}$. No complaint. Lost.

I. Number of case	38
II. Eye affected	Right.
III. Position and character of the wound	Large corneal wound near temporal limbus.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Hyphæma Iris engaged in wound. Lens cataractous. Tension —.
V. Visual acuity of injured and uninjured eye	Right: perception of light Left [illegible]
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Only slight reaction to magnet externally. Scleral puncture (near foreign body) not successful. Secondary glaucoma came on suddenly from swelling of lens.
X. Results two years afterwards	Lens matter drawn off, but eye had acute iridocyclitis. 10 days after injury, was enucleated—small chunk in vitreous—non-magnetic. Left [illegible] No complaint Lost

I. Number of case	[illegible]
II. Eye affected	[illegible]
III. Position and character of the wound	Penetrating wound, lower and inner quadrant of cornea.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Iris engaged in wound. Total hyphæma.
V. [illegible] and uninjured eye	[illegible] [illegible]

VI. Time intervening between date of injury and patient first presenting himself	Same day
VII. X-ray plate	Positive. (Taken *after* magnet operation).
VIII. Position of foreign body ...	Behind eyeball.
IX. Magnet and other operations, and subsequent complications	Electro-magnet, at first gave a "full" feeling, then a small scale (3 mm. × 2 mm.) was extracted by anterior chamber route. Iris snipped. 23 days after the magnet had been applied (as the eye was still irritable), an X-ray plate was taken, and showed foreign body apparently behind eyeball. Electro-magnet again applied, but no result. Enucleation done one month after date of injury. Iridocyclitis. Metal scale adhering to back of eyeball. 8 months after injury to right eye, sympathetic iridocyclitis developed in left—a severe type—and ultimately ended in complete destruction of the eye as far as vision was concerned. Two blood counts normal as far as increase in large hyaline cells was concerned.
X. Results two years afterwards	Right eye enucleated, and hand movements in left as a result of sympathetic. Lost, *plus* sympathetic.

I. Number of case	40.
II. Eye affected	Left.
III. Position and character of the wound	Small perforating (4 mm.) wound, upper and inner quadrant of cornea. White streak of Descemet's membrane.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	"Hole" of iris behind wound. Lens cataractous.
V. Visual acuity of injured and uninjured eye	Left: counts fingers. Right. $\frac{6}{6}$
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Metal drawn into anterior chamber. Limbal section and extraction of scale (4 mm. × 2 mm.). Enucleation 25 days afterwards. Iridocyclitis. Vitreous exudate, &c.
X. Results two years afterwards	Right: $\frac{6}{6}$. No complaint. Lost.

I. Number of case	41.
II. Eye affected	Right.
III. Position and character of the wound	Small penetrating wound, lower and outer quadrant of cornea.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	"Hole" of iris behind. From this point of puncture of the iris, a track of opacity travels backwards and inwards through the lens.
V. Visual acuity of injured and uninjured eye	Right $\frac{6}{12}$. Left. $\frac{6}{5}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.

VIII. Position of foreign body ...	Posterior part of vitreous.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. No result when magnet applied externally. Scleral puncture down and in, and extraction of small scale (2 mm. × 1 mm.); soft lens matter removed later.
X. Results two years afterwards.	Right +12 D. sph. +16 D. sph. J. 1. Left Saved.

I. Number of case	42.
II. Eye affected	Right.
III. Position and character of the wound	Oblique scleral wound just below limbus.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Wound now partially healed. Cornea steamy. Pupil sluggish. Iris hazy. Small hypopyon.
V. Visual acuity of injured and uninjured eye	Right: hand movements. Left
VI. Time intervening between date of injury and patient first presenting himself	3 days.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	Vitreous—high up.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Owing to before-mentioned signs of inflammation in the vicinity of the anterior chamber, superior sclerotomy was done, with extraction of small scale (4 mm. × 3 mm.) Eye shows a tendency to soften and ciliary tenderness. Enucleation advised, but refused.
X. Results two years afterwards	Right: perception of light. Soft eyeball. Left: $\frac{6}{6}$. No complaint. Saved.

I. Number of case	43.
II. Eye affected	Left.
III. Position and character of the wound	Oblique scleral wound (3 mm.) down and in
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Punctured wound of lid in front of wound. Vitreous hazy and numerous blood clots in it. A separation of retina made out, down and in, behind site of wound. Visual field defective, corresponding to this point.
V. Visual acuity of injured and uninjured eye	Right: perception of light. Left
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	Vitreous—outer side—behind.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Metal drawn into anterior chamber round temporal side of lens. Iridectomy before drawing into anterior chamber. Extraction by corneal section of chunk (5 mm. × 3·5 mm. × 3 mm.). Enucleation 3 months later owing to soft and tender eyeball and complaints of some pain in right eye.
X. Results two years afterwards	Right: $\frac{6}{6}$. No complaint. Lost

I. Number of case	44.
II. Eye affected	Left.
III. Position and character of the wound	Wound (5 mm.) in lower and inner quadrant of cornea, near limbus.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Iris engaged in wound. Cornea and iris hazy.
V. Visual acuity of injured and uninjured eye	Left: counts fingers. Right: $\frac{6}{24}$ hypermetropic astig.
VI. Time intervening between date of injury and patient first presenting himself	1 day.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. No response externally. Sclerotomy down and in, and extraction of scale (4·5 mm. × 3.1 mm.). Engaged iris snipped. Was dismissed with vision of fingers at 12 feet. Enucleation, owing to recurrent iridocyclitis, advised but refused. A year later developed a hypopyon-ulcer owing to new injury (?)
X. Results two years afterwards	Left: perception of light (large corneal nebula). Right: $\frac{6}{6}$. No complaint. Saved.

I. Number of case	45.
II. Eye affected	Left.
III. Position and character of the wound	Ciliary wound (3 mm.) outer side.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Pupil displaced slightly owing to engaged iris. Anterior chamber empty.
V. Visual acuity of injured and uninjured eye	Left: counts fingers. Right: $\frac{3}{60}$. Hypermetropic astig.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Scale (3 mm. × 2 mm.) extracted by original wound owing to empty anterior chamber. Conjunctiva sutured over wound. Eye healed well. No iridocyclitis.
X. Results two years afterwards	Left: counts fingers (large vitreous opacities). Right: $\frac{3}{60}$ $\frac{+8\text{ D. sph.}}{+1\cdot5\text{ D. cyl. vertical}} = \frac{6}{18}$. Saved.

I. Number of case	46.
II. Eye affected	Left.
III. Position and character of the wound	Ciliary wound (4 mm.) involving cornea at lower part of limbus.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Tension —. Iris engaged in wound. Lens cataractous.

V.	Visual acuity of injured and uninjured eye	Left : hand movements Right [illegible]
VI.	Time intervening between date of injury and patient first presenting himself	Same day.
VII.	X-ray plate	Positive.
VIII.	Position of foreign body ...	Vitreous—posterior part.
IX.	Magnet and other operations, and subsequent complications	Electro-magnet. Metal drawn into anterior chamber and extracted (scale 4 mm. × 3 mm.). Prolapse excised. Wound covered by conjunctiva. Cataract extracted 5 months after injury.
X.	Results two years afterwards	Left : + 10 D. sph. + 1 D. cyl. horiz. = $\frac{6}{18}$. Right [illegible] Saved.

I.	Number of case	47.
II.	Eye affected	Left.
III.	Position and character of the wound	Central penetrating wound of cornea. White streak of Descemet's membrane
IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Lens cataractous. Anterior chamber almost empty. Tension —.
V.	Visual acuity of injured and uninjured eye	Left : hand movements. Right : [illegible].
VI.	Time intervening between date of injury and patient first presenting himself	One day.
VII.	X-ray plate	Positive.
VIII.	Position of foreign body ...	Vitreous—posterior part.
IX.	Magnet and other operations, and subsequent complications	Electro-magnet. Scale (2 mm. × 1 mm.) drawn through cataractous lens into anterior chamber. Corneal section and extraction. Soft lens matter drawn off 14 days later. Loss of some vitreous. Eye kept well till 8 months after injury, when hyphæma developed and eye became soft. Enucleated 9 months after injury. Painful and soft eye with no vision.
X.	Results two years afterwards	Right : $\frac{6}{9}$. No complaint. Lost

I.	Number of case	48.
II.	Eye affected	Right.
III.	Position and character of the wound	Small ciliary wound (4 mm. [illegible]
IV.	Other complications and special points on naked eye and ophthalmoscopic diagnosis	Lens cataractous. Ciliary injection. Iris muddy. Iris engaged in wound.
V.	Visual acuity of injured and uninjured eye	Right : [illegible] Left : [illegible]
VI.	Time intervening between date of injury and patient first presenting himself	[illegible]
VII.	X-ray plate	Positive.
VIII.	Position of foreign body ...	Vitreous—posterior part.

IX. Magnet and other operations, and subsequent complications	Electro-magnet. Scale (3 mm. × 3 mm.) drawn into anterior chamber. Corneal section and extraction. Enucleation advised early. Patient did not consent. Softening eyeball with ciliary tenderness. No vision. Four months after injury, some watering and injection of left eye. No keratitis punctata, but disc hyperæmia. Blood count normal. Blind spot normal. Enucleation one year after injury.
X. Results two years afterwards	Left: $\frac{6}{9}$. No complaint. Looks well. Lost.

(*To be concluded*).

CLINICAL MEMORANDA.

RHINOSPORIDIUM OF THE LACRYMAL SAC.

BY

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RHINOSPORIDIUM KINEALYI is common enough in Southern India as a cause of growths in the nasopharynx and nasal cavities, and is also occasionally found in conjunctival growths*; but the following case of growth in the lacrymal sac must be almost unique, since the infection appeared to be limited to the sac, no growths being found elsewhere after a careful examination.

Case.

The patient was a male Mahomedan, aged 32 years, who was admitted to the Madras Ophthalmic Hospital on February 4th, 1915. He complained of a swelling at the inner side of his left orbit, which occasionally gave him some slight pain.

The swelling had been noticed for a year, and at first was intermittent and caused no lacrymation. The symptoms had, however, become much more evident during the two months previous to admission. The swelling had become larger, but still disappeared on pressure, a quantity of pus at the same time passing into the left nostril.

The swelling was larger than that usually caused by a distended sac, being somewhat bigger than a kidney bean. It was rounded and extended further outwards along the lower margin of the orbit than the ordinarily dilated sac does. The skin covering the area was slightly inflamed.

Treatment.

The sac was excised on February 6th, 1915. It was found to be partly disorganised, and to have soft walls lined by a granulation tissue, which formed very small polypoid growths. The bony bed of the sac was inflamed, and the sac had blended with the inflamed orbital tissues on its outer side. It contained creamy pus, and there was very free bleeding during its removal, which was effected in three pieces. The wound healed well, and the patient was discharged from hospital on the sixth day.

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* For a case affecting the conjunctiva by R. H. Elliot and A. C. Ingram, *see* THE OPHTHALMOSCOPE, August, 1912.

Recurrence took place one month later, with bleeding from the left nostril and pain over the site of the wound.

When seen on April 9th, 1915, a small lump was found to have formed beneath the operation scar. This was hard and slightly painful.

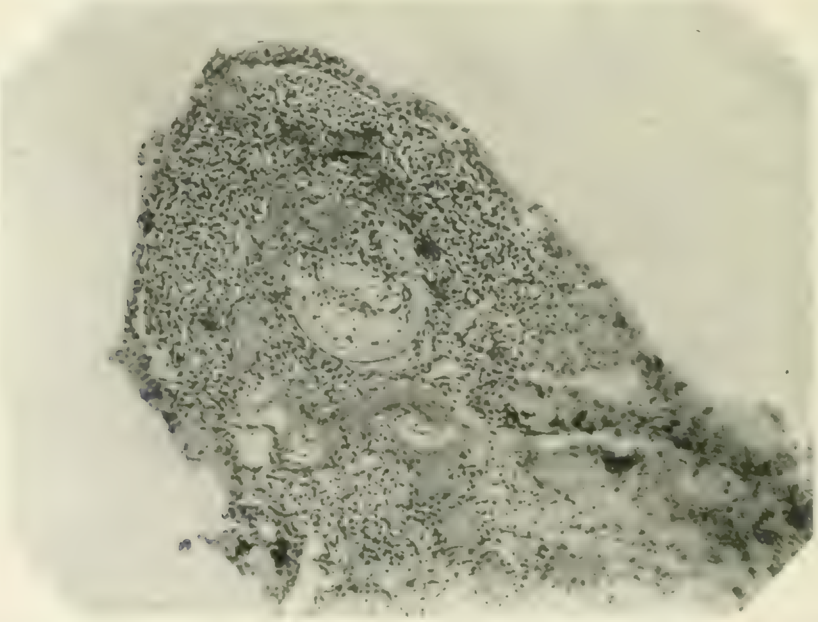
A second operation was performed on April 10th, when a mass of soft fibrous inflammatory tissue containing creamy pus, and some very soft jelly-like granulations was excised. The lacrymal groove was partly carious. The cavity was thoroughly scraped and irrigated with a solution of quinine, 10 grains to the ounce, and the wound closed by two sutures. The patient was discharged on April 17th.

Result.

He was seen again on February 16th, 1916 (ten months after the secondary operation), when there was no sign of recurrence, and the amount of scarring was so slight as to render it difficult to believe that such excessive damage to the tissues had existed. No trace of the disease could be detected in the nose or naso-pharynx.

Pathology.

Histological examination shows a granulation tissue which is very rich in plasma cells. Embedded in this are numerous small cysts whose walls have in some instances undergone partial absorption and shrinkage. Many of the cysts are empty except for some granular matter; others have discharged and their cavity is occupied by connective tissue cells, and in some pansporoblasts and sporemorulæ are clearly seen.



On the whole, there is greater absorption and shrinkage of the cyst walls, whilst well formed cysts are fewer in number than is common in nasal and conjunctival rhinosporidium.

Typical rhinosporidial cysts were well seen in fresh specimens.

The microphotograph shows a large discharged cyst lying in the subepithelial tissue. In the neighbourhood are some shrunken cysts.

The use of quinine is worth noticing, as I have always found these growths most difficult to eradicate. Colonel Niblock, I.M.S., informs me that he has since used quinine for naso-pharyngeal rhinosporidium with very satisfactory results.

FUNCTIONAL CYCLOPHORIA.

BY

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PRIVATE E. was first seen by me at the Northumberland War Hospital.

He had not been wounded nor had he suffered from any shock at the front; he was sent to the hospital in order that his left inguinal hernia should be operated upon. A radical operation was performed by Major Grange with complete success.

I was asked to see him, as he complained of headache and other troubles when he read.

I found that his refraction was normal, as also was his muscular balance when tested with Maddox rods. He said he frequently "got very giddy, and did not know where he was." He complained of feeling that the adjoining walls were falling down on him, and this led me to suspect cyclophoria (or "periphoria" as I prefer still to call it). On June 1st my colleague, Dr. Dunn, tested him with a double prism that I lent him for the purpose. He found definite *intorsion.*

His general condition was poor; tremors of the head and hand, slightly exaggerated knee jerks, frequent blinking, and general mental dulness and depression were the most prominent symptoms. Dr. Drummond, who saw him in consultation, regarded the condition as wholly functional. This had been my own view, except the periphoria, which I had always looked upon as a congenital condition.

However, on the next day (June 2nd) when I saw him I hardly recognized him. He was bright and cheerful, and told me that there was nothing the matter with him. There were no head tremors, but his hands, when extended, were still tremulous. He said that he had fallen down the stairs on the previous afternoon, and that "his head cleared up at once." On testing him with the double prism, I found that there was no trace of periphoria. I feel compelled, therefore, to regard it as a case of functional periphoria, or cyclophoria, if the usual, but somewhat meaningless, term be preferred.

A CASE OF PNEUMOCOCCIC CONJUNCTIVITIS.

BY

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LIEUT. R.A.M.C.,
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THE following case is interesting because the infection was pure; *i.e.*, only one organism appeared to be present, and for its short and satisfactory ending after adequate treatment.

A. B., *æt.* 45 years, a medical man, who had previously suffered from a troublesome nasal and pharyngeal catarrh, was seized with a well-marked conjunctivitis. The eye was normal the night before, but a few hours after getting up, there was not only pain and irritation but a well-marked bead of pus collected at the inner angle with the usual accompanying symptoms.

At 2 p.m. the same afternoon, a swab was taken, and slides of the pus showed that almost every leucocyte contained at least one diplococcus and often many more. No other organism was present or grew in the culture.

In the absence of fresh eusol, the eye was now thoroughly irrigated with silver nitrate solution, grs. v. ad ℥i, the upper lid well raised, and the lower brushed with a swab of wool, and salt solution was *not* used to neutralise the silver salt.

The lids swelled up considerably. Next morning, the pus had entirely ceased, even after sleep.—Fresh eusol solution, 1 3 of the ordinary strength used in wounds (·16 per cent.), was dropped into the eye and caused comparatively little pain. This was repeated the same afternoon but caused considerably more inflammation, the conjunctiva being not merely red but of a dark purple.

At the patient's request and that of his friends, I agreed to discontinue the eusol and to revert to warm boric acid douches, four or five times daily, with excellent results.

A slide of the slightly purulent discharge which collected at the end of the following night, *i.e.* on the fourth day, showed no organisms whatever under the microscope, and the clinical picture agreed in every way with this finding.

Remarks.

Having suffered for some months from a similar conjunctivitis, I warned the patient not to be too sanguine about an early cure in his case.

I attribute the success in this case to:—

1. The early date at which suitable treatment was adopted. Had it been treated for a week with boric solution, it is extremely unlikely that either silver nitrate or eusol would have proved effective, for, as a friend remarked, the pneumococcus would have had time to burrow into the tissues.

2. The very thorough irrigation of the conjunctival sac. It is too often thought that to evert the lid and paint the same with a caustic is enough; the fornix is more important than the smooth upper lid.

3. To my mind, the essential point in treatment is to treat not only the clinical picture, but to do this in accordance with the pathological evidence at hand.

Probably the eye was infected from the nasal duct.

I append a short report from the pathologist, Captain Rentoul, R.A.M.C., who very kindly examined the slides and made cultures of the pneumococcus

Report on the above case by Capt. Rentoul, M.B., Ch.B.

On March 28th, 1916, I was asked to examine pus taken from a case of conjunctivitis.

The smear on the slide showed pneumococci in pure culture. Some were in the pus cells but most were lying free. They all had well-marked capsules.

The swab was used for planting out. Here again I obtained a pure growth of pneumococci.

The interesting points to notice were:

1. So pure a growth of pneumococci in a direct smear.
2. So pure a growth on culture.
3. On the fourth day, I again examined a smear and found no organisms.
4. The fact that several cases of pneumococcic fever had occurred in the neighbourhood. In these cases the only symptoms were malaise and a temperature of 102°F. to 104°F., ending in a few days by crisis. In all these cases I grew a typical pure pneumococcus from the blood (5cc.) and urine.

THE TREATMENT OF SUBACUTE AND CHRONIC GLAUCOMA.

A discussion at a meeting of the Midland Ophthalmological Society, held at Birmingham, on April 4th, 1916.

By T. Harrison Butler, M.D.Oxon.,
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In opening this discussion, it is my sincere wish to preserve an absolutely judicial attitude, and to avoid any prejudice or even enthusiasm.

The few conclusions I have come to, the results of a careful, and, I hope, impartial, study of my own material, are merely provisional and tentative.

In the absence of any knowledge of the ultimate cause of glaucoma, our methods are empirical, and we can judge of their efficiency only by a critical study of the results obtained. We must be guided by an analysis of a sufficient number of cases, which each operator should endeavour to make for himself. Unfortunately, few of us have the requisite number of patients for our purpose, and perhaps we none of us make the most use of the material we have. When we come to examine past cases, we find that some important fact has been omitted from the notes, as, for example, the exact condition of a filtering scar before a late infection. Want of time is the greatest difficulty we have to contend against. Few provincial clinics are adequately staffed with trained assistants and pathologists, and note-taking, to be efficient, must be done by the surgeon himself. To arrive at a knowledge of final results, it is necessary to write for many patients, and some must be visited at home. Frankly, we have not the time to do it. In consequence, there are, as far as I know, no statistics available which enable us to form an opinion of the comparative merits of the rival methods of treating glaucoma. It is not sufficient to compare the sclerectomy figures of one surgeon with the sclerotomy figures of another, because opinions differ so widely as to what constitutes a successful case. Any comparative statistics must be the work of one man. The best method would be for a senior resident to analyze the work of all the surgeons in such a hospital as the Birmingham Eye Hospital. We should then have an impartial judgment, founded upon ample material.

I suggest that the present discussion be directed upon three points:—

(1) Should we treat any case of glaucoma by meiotics, and, if so, under what conditions?

(2) Having decided to operate, shall we perform an iridectomy, a sclerectomy, or a sclerotomy, and what circumstances should influence our choice?

(3) What is the best method of dealing with the subacute cases?

As a help to the discussion, I place before you an analysis of the results of seventy cases of chronic and subacute glaucoma upon which I have operated during the past eight years. They are all instances of primary glaucoma, and contain no cases due to intumescent cataract, or other forms of secondary glaucoma. A case is classed as succesful if the operation has definitely arrested the disease, and if at the time of the last note, the vision has been maintained or improved. The state of the tension and fields has also been taken into consideration. The patients have not so far been selected for operation. I have performed a series of iridectomies, then a sequence of scleral operations, followed by a second list of iridectomies.

After two years of sclerectomies, the irregularity of the scars obtained, and the occurrence of cases of late infection led me to revert to iridectomy. The total failure, however, of several technically perfect operations to reduce tension has influenced me in the direction of scleral operations, and now I intend to try a combination of Herbert's small flap method with iridectomy.

My sclerectomies have been performed according to Elliot or Holth's methods, and I have cut my flaps exactly as I have seen Elliot make them, taking great care to get a thick covering for the aperture. In spite of this, I have obtained several very undesirable ectatic scars, and I have seen many others produced by skilful surgeons. In other cases an exactly similar operation upon the same patient has been followed by complete closure of the hole, and subsequent failure of the intervention.

After a prolonged trial, I have for the present abandoned Holth's punch operation, because in trying to get as far forward as possible, the female blade of the punch is apt to be pressed upon the conjunctiva and produce a small button-hole. This has happened four or five times, and four of these button-holed cases have suffered from a late infection of greater or less severity. I have, so far, not button-holed a flap during reflection. Were I to do so, I should never trephine the sclera below the rent. It is asking for trouble to do so, a request generally granted sooner or later! I have generally placed a suture across the tear, but not through it, to approximate its edges, and I see no valid objection to the procedure.

My iridectomies have never been classical. I use a small keratome, and make a moderately broad coloboma which extends as far back towards the iris root as possible. A large incision into a glaucomatous eye is, to my mind, fraught with grave peril.

If you will refer to my analysis you will see that *iridectomy* was performed twenty-three times. 56.52 per cent. of the operations were successful, 34.78 per cent. failed, and 8.7 per cent. were doubtful.* The cases I have classed as doubtful were those in which either the results were uncertain, or the case was too recent for the ultimate effect to be gauged.

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* [illegible] field, and was trephined with no better success.

Forty-two *scleral operations* are recorded, and of these cases 58.13 per cent. were successful, 37.22 were failures, and 4.65 were doubtful. It will be at once seen that the results of iridectomy and of scleral operations are about equal.

In the table which is in your hands, you will see that I have further analyzed the operations, dividing up the scleral operations into sclerectomy with and without iridectomy, and sclerotomy. The numbers are too small to render these figures of any value, but as far as they go, they support Col. Elliot's contention that sclerectomy without iridectomy is as effective as when combined with iridectomy.

You may remember that Mr. J. J. Evans and I claimed a percentage of 75 per cent. for our successes after analyzing 160 cases.* If we count the doubtful operations as successes my present figure stands at about 65 per cent. The difference is due to the fact that two years have elapsed and many of the original cases included here for the second time have gone down hill, and to the more critical attitude I have adopted. My present feeling is that we save 60 per cent. of our glaucomas by operation, at any rate for four or five years. My colleagues who have been longer in practice will probably place the figure still lower, say, at 50 per cent.

The causes of failure have been as follows :—

Scleral Operations. (Including repeat operations.)

1.	Complete cicatrization of the scleral wound ...	6 cases
2.	Poor filtration	1 ,,
3.	Good filtration but no lowering of tension	2 ,,
4.	Hole blocked by iris	3 ,,
5.	Late infection	3 ,,
6.	Loss of vision following decompression (due to rapid contraction of the field of vision)	2 ,,
7.	Vitreous opacities	1 ,,
8.	Lens came forward	1 ,,

Iridectomy.

1.	Prolapse of iris and iridoçyclitis	1 ,,
2.	Punctate Retinal Hæmorrhages	1 ,,
3.	Loss of vision following decompression (due to contraction of the field of vision)	1 ,,
4.	Lens came forward	1 ,,
5.	Perfect operation, but no reduction of tension ...	3 ,,
6.	Friable iris made operation impossible	1 ,,

Excluding all questionable cases, there were three total losses after sclerectomy, due to late infection, a percentage of 7. I believe that in Vienna 8 per cent. of sclerectomies have been lost from this cause (personal communication from Mr. Giri). There was one total loss after iridectomy. The iris became prolapsed, and severe irido-cyclitis necessitated the removal of the eye. This gives a percentage of 4.35.

My figures show that the ultimate result of the two methods is slightly in favour of sclerectomy. Iridectomy is by far the simpler method, the patients are fit to leave the hospital in a week, the complications are few, and the surgical result almost uniformly satisfactory. On the other hand, in some of the cases the operation has no effect whatever. Sclerectomy is a very much bigger affair, it takes much longer, the patients generally have to remain in the hospital a fortnight, and there are many complications including the ever present danger of late infection. But when one gets a good result it is a very good one.

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*The Ophthalmoscope, August, 1914.

Under the circumstances it should be possible to select the patients most suitable for one or the other operation.

Cases which have more or less held their ground under meiotic treatment, but are beginning to show functional disturbance, are, I think, best served by iridectomy. Again, patients in whom the rise of tension is slight or only occasional, in whom the stress of the disease is shown chiefly by cupping of the disc and contraction of the fields, should be treated by iridectomy. Those with high tension, those with a long history, and cases in which the pupil is dilated or the iris atrophic, will be more suitable for sclerectomy. Again, some form of sclerectomy must be employed when iridectomy has failed. I am, however, not at all certain that when iridectomy, correctly performed, has totally failed to reduce the tension, that sclerectomy will do much better. I have not yet sufficient experience to form any opinion upon this point.

Only a few of the successful iridectomies showed any sign of a filtering scar. By filtration I mean a definite œdema of a more precise nature than the slight pitting to a probe which may be detected in many normal eyes in persons past middle age.

I have not had the time necessary to look up the notes of all glaucomas to discover the results of meiotic treatment, but in one of the patients included in the statistics given, one eye was treated by sclerectomy and is now nearly blind, although the tension was permanently reduced; the other was treated with meiotics and was still a useful eye when last seen. I have another aged patient who has held his own for two or three years using pilocarpine nightly, and will, I expect, die before his sight fails.

I would adopt meiotic treatment in any glaucomatous eye in which I could not detect any rise of tension after repeated and regular examination with fingers and tonometer. In such a case I should only operate when there was advanced functional failure, and even then I should expect no good effect from any operation. It seems to me meddlesome surgery to decompress an eye when the tension is not raised.

I adopt treatment with meiotics in cases with retinal hæmorrhages, even in the presence of a raised tension. The results of operation in these cases are so bad, that I think the patients are likely to see longer if left alone. The question whether early cases of glaucoma with no loss of function, but with slightly raised tension, should be given a trial with meiotics is a difficult one. If the patient be under constant observation, it may be justifiable, but I prefer to perform a small iridectomy as soon as possible. The effects of early operation are so very superior to those of later interventions, that I think that, *when a definite rise of tension has been established upon three or four occasions, it is much wiser to perform iridectomy at once.* These early cases seem to me to be the especial province of iridectomy.

Should we perform a prophylactic operation upon the second apparently sound eye, when the first eye has shown definite signs of glaucoma? Here, again, we should be guided by circumstances. If the patient can be under constant observation, I should prefer to wait for some symptom or sign of glaucoma, more particularly if he be willing to regulate his life; but if he be of uncertain habits, or cannot be seen at regular intervals, it will probably be safer to perform a narrow but peripheral iridectomy. *I should never, under* *any circumstances, adopt any form of sclerectomy at a prophylactic operation.* I have upon three occasions seen acute glaucoma follow the closure of a filtering scar. The eye accommodates itself to a subnormal tension, and the sudden rise to normal may be very badly tolerated. On one occasion I trephined as a prophylactic operation. The aperture healed up solidly, and acute glaucoma supervened A second patient suffered from delayed closing of a cataract wound. At the end of a fortnight, the wound closed, and subacute glaucoma developed, which, however, was overcome without operation. The third case is interesting.—A cataract patient went home with an apparently perfectly healed wound. There was slight attachment of one of the pillars of the coloboma to the wound which dated from the preliminary iridectomy, but there was no sign of a prolapse. At the end of a month, she reappeared with a large prolapse. This was excised, and the opening covered with a conjunctival flap. No sign of a fistula was evident, but the eye remained soft for some months. I heard that one night she suddenly developed acute glaucoma, and had a second iridectomy performed at Harrogate. These three cases show that a filtering scar may cease to perform its functions and may cause acute glaucoma, and that it should not be chosen as a prophylactic operation. The risk of late infection is a second cogent reason why an iridectomy should be preferred.

I should like to say a few words about the bogey of the shallow chamber. My experience may be peculiar, but I have only once met with a really shallow chamber in chronic glaucoma which compelled me to use a Graefe knife for the iridectomy instead of a keratome. In such cases, which are, I think, never favourable to a good result, I consider the trephine should be the instrument of choice.

I sincerely hope that this discussion will shed some light upon a very difficult problem, but I fear that we must wait for the full solution until we know something more definite about the pathology of the disease.

Statistics of 70 Operations for Chronic and Subacute Glaucoma.

All Scleral Operations.

Good ...	58·13
Bad ...	37·22
Doubtful	4·65

Operation.	Number.	Good Result.	Bad Result.	Doubtful Result.
Sclerectomy ...	37	22=59·47%	13=35·13%	2=5·4%
Iridectomy ...	23	13=56·52%	8=34·78%	2=8·7%
Sclerotomy ...	6	3=50·00%	3=50·00%	—
Total ...	66	38=57·57%	24=36·36%	4=6·06%
Secondary Sclerostomy	3	1=33·33%	2=66·66%	—
Sclerectomy with Iridectomy ...	28	16=57·14%	11=39·28%	1=3·57%
Sclerectomy without Iridectomy ...	9	6=66·6%	2=22·22%	1=1·11%

One case of iridectomy was lost sight of, but the initial result was good. It is not included in the above table.

By N. C. Ridley, F.R.C.S.,

PRESIDENT,
LEICESTER, ENGLAND.

Mr. Ridley thought that whatever operation was adopted should be performed early. The results of early operation were very superior to those of later intervention.

By R. H. Elliot, M.D., F.R.C.S.,

LONDON, ENGLAND.

Lt.-Col. Elliot thanked the members of the Midland Ophthalmological Society for their kindness in inviting him to be present and to speak.

He reminded them that fifteen years ago, de Wecker had collected the opinions of the most famous ophthalmologists of the time on the subject of the value of iridectomy for the treatment of simple glaucoma.

Out of 112 surgeons, who gave de Wecker their views on iridectomy,

59 continued to perform the operation ;

11 did not do the operation ;

19 had given it up as useless, or had almost done so ;

10 more recorded poor or bad results, which evidently discouraged them from continuing to operate, and 23 held on to iridectomy *faute de mieux*.

Thirty-four of the surgeons who replied to de Wecker furnished him with statistics, some being very vague In considering this figure it must be remembered that, as shown above, a large number were too discouraged to make any such attempt. Of those who did so :—

10 gave their successes from iridectomy for simple glaucoma as very few or *nil*. These included Badal, Dufour, and Lagrange ;

5 gave 20 per cent. or less, these included Axenfeld, Demetriades, and Hansen Grut ;

10 gave over 20 and not more than 50 per cent. ;

4 gave 50 to 70 per cent. ; these included Derby and Uhthoff ;

4 more gave 70 per cent. and over ; these included Haab, Hirschberg Hornu, and Kuhnt ; whilst

1 (Manolescu) claims our admiration (!!) with 100 per cent. of success.

In appreciating these statistics, it is to be remembered that they were derived from the practice of the very cream of the ophthalmologic world at a time when that operative practice was divided amongst a comparatively small number of men. Moreover, with the exception of the latter part of the era from which the figures are derived, there were no other operative measures to claim the surgeon's attention, and so to distract him from giving iridectomy a full and fair trial. When these facts are borne in mind, it will, I think, take a very bold man lightly to brush aside the very clear evidence of the past. Comparatively few of those who were consulted spoke with any measure of enthusiasm. The attitude of a large number clearly was that, inasmuch as in simple glaucoma all other roads lead certainly to ruin, whilst iridectomy did good in a certain number of cases, it was right and rational to undertake this operation.

de Wecker himself devoted nearly 200 pages of closely-written matter to the subject ; these are manifestly and avowedly a defence of iridectomy. It is, therefore, of great interest to observe that he takes up practically the same position. His desire was to stem the tide, which he felt was setting too strongly against von Graefe's operation. He saw that the swing of the pendulum was carrying surgeons too far in the opposite direction, and he combated this movement with all the great force that was in him.

In doing so, he rendered good service to ophthalmology, and one which will not soon be forgotten. Reading between the lines, however, one cannot resist the conviction that he started his work on this subject an ardent iridectomist, and modified his views, as every large-minded man must, under the pressure of the experience of others. Be that as it may, one thing is certain, *viz.*, that he closes the paper with a strong advocacy of the combination of sclerotomy and iridectomy. Like several of the great surgeons of the past, including von Graefe himself, de Wecker's strong, earnest, practical mind reached out to the great possibilities lying dormant in a filtering cicatrix. At a time when there seemed no possibility of commanding such results at will by operative measures, the foresight and the surgical instincts of these master minds made a reality of what to others, less able and less prescient, seemed but a chimera. de Wecker defended iridectomy, it is true, and he defended it against some of the ablest men of his day, but running through all his writings are two great ideas :— (1) that if any operation is to succeed in glaucoma, it must be done at the earliest possible moment, and (2) that a large element in the success of operations undertaken for glaucoma is the establishment of a filtering cicatrix.

I should like to speak of these two matters a little more in detail.

In reviewing the literature of the past, and in endeavouring to learn the lessons which the writings of the old members of our craft have to teach us, there is one thing that has struck me more than any other, *viz.*, the insistence by so many of the great master minds on the importance of early operation for this affection, an insistence which I have, with pleasure, heard Mr. T. H. Butler repeat to-day. Like the dominant phrase in some magnificent piece of classical music, the advice to operate without delay rings through all the best literature of the subject. It is the big thought in the practical treatment of glaucoma. It bulked largely in von Graefe's mind ; it was strenuously put forward by de Wecker ; it had the support of such names as Coppez, Fuchs, Sattler, Schmidt-Rimpler, Swanzy, and many others. In the years during which I have strenuously advocated that once the diagnosis of glaucoma has been made, operation should very seldom be delayed, I was unaware that in the past history of our craft, this advice rested upon such a magnificent basis of expert support, as I now find it does.

It would be strange if an opinion so long held by able surgeons proved to have no anatomico-pathological explanation. We owe that explanation (as we do so many others) to the genius and patient work of E. Treacher Collins. He has shown that when an iridectomy is performed very early in the course of an attack (and even of an acute attack) of glaucoma, the iris can be, and often is, torn away at its root, *i.e.*, at its attachment to the ciliary body, whilst if sufficient time has elapsed to allow of the formation of adhesions between the iris root and the adjacent cornea, the line of tear is along that of the anterior boundary of the adhesion. In the former case, he contends that a large portion of the filtration area is left free for drainage ; this portion may suffice to maintain the excretion of fluid from the eye at a normal level, even although the remainder of the iris may be in a faulty position.

From these remarks two salient points emerge, *viz.* :—

(1) That any operation for glaucoma which aims at reducing tension, by the removal of a portion of the iris, must be done before adhesions have had time to form ; therefore the earlier the better ; and (2) that statistics which set out to show the value of iridectomy in the treatment of glaucoma, will probably be valueless, unless they are written round this very important factor in the case. To publish the results of iridectomies for glaucoma, some of

which have been at the first blush of the disease, others at a decidedly later period, and still others at a time when anatomical changes had made success well nigh impossible, is manifestly illogical. I am assuming that you follow and agree with me in my previous contentions.

This leads me naturally to my second point, *viz.*, that a large element in the success of iridectomies undertaken for glaucoma, is the more or less accidental establishment of a filtering cicatrix. It is this which explains why iridectomy may prove so much more, and so much oftener successful than we should have anticipated. It has been claimed that, inasmuch as a late iridectomy may completely relieve an attack of glaucoma, it cannot be essential that the whole depth of the iris should be removed. True, but I contend that in all such successful cases, an examination with a probe will reveal a pitting of the conjunctiva which will be sufficiently marked to prove that subconjunctival filtration of the aqueous fluid is taking place.

I shall be in danger of being accused of having contributed nothing synthetic to this discussion. It may be said that my remarks have been replete with the intention to destroy. That has not been my wish. But, I hold that the time for considering this great question on a statistical basis has not yet arrived. I am not trying to belittle any or every honest effort to collate our facts and to draw lessons from them. Every such step must bring us nearer our goal, and be of value, but I do wish to point out that deductions made from comparatively small statistics are full of danger.

On the other hand, we may approach the question of the relative merits of iridectomy and of the filtering operations, from another, and I venture to think, an at present larger standpoint, that of anatomy and physiology. We know that the filtering scar is a possibility; we know that we can command it at will; we know that we can do much to safeguard it against what we believe to be its principal dangers. In other words, we know how it acts, how to obtain it, and how to obtain it most safely. That it has dangers no one will deny, and I for one have never shirked that side of the question. But, and I say it very deliberately, it has come to stay. It was dreamt of by von Graefe, eagerly sought for, through long years, by de Wecker, and by many another of the best ophthalmologists of the past, and was realised by the genius of Lagrange. I hear men prophesying its speedy downfall. Too many great minds have clung to the idea to make such a thing likely. It is one of the big things of ophthalmology. We may not live to see it triumphant, but of this I am confident, that it will emerge from strife and turmoil to be enthroned in the minds of future ophthalmologists. Meanwhile, I would enter the plea that you should look at it in the large, see it as a physiological fact, with a solid anatomical basis, and not condemn it on statistics for which the time is not yet ripe. At the same time, we must gather all the statistics we can, but we must do so in the light of the fact that the period of glaucoma has a paramount influence on the success or failure of any operative procedure undertaken for the relief of intra-ocular pressure.

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In the course of the discussion which followed, Lieut.-Colonel Elliot added the following remarks.—He did not advocate immediate operation in the very old; he agreed with Mr. Butler that the relative prospect of life and of probable duration of sight, and the danger of post-operative insanity should then be carefully weighed. He felt strongly, and he was glad to see Mr. Butler agreed with him, that the earlier the operation was undertaken, the better was the prospect of a successful issue, and especially was this true of iridectomy; trephining gave the operator much more latitude in this respect. In very early cases trephining was one of the easiest operations one could undertake for glaucoma. With regard to the stay of patients in hospital after trephining, he usually kept his private patients in the home for a week. He had frequently trephined patients whose field had narrowed down to within a few degrees of the fixation area, and his experience had been that of Mr. Beatson Hird and others who had stated that they had seen no harm come of the operation.

It was a mistake to suppose that the older surgeons performed iridectomy always through a sclero-corneal incision. Not a few of them laid stress on the incision being made as far back as possible.

By J. JAMESON EVANS, M.D., F.R.C.S.,
BIRMINGHAM, ENGLAND

IN the estimation of the value of any form of treatment for glaucoma, we must not lose sight of the fact that our primary object is to arrest the progressive depreciation of vision. Lowering of intra-ocular tension is of secondary consideration, and is of importance only in so far as the increased tension may be considered the cause of failing sight. That reduction of intra-ocular tension to the recognised normal level, or below, does not necessarily cure glaucoma is, I think, quite familiar to all of us.

Another point we have to keep in mind in discussing relative values is the naturally slow progress of many cases of glaucoma, and the necessity of prolonged, repeated, and careful examinations of the cases treated. Further, prolonged observations are necessary owing to the fact that the immediate results of operative measures are often very different from those found two, three, or more years later. In fact, there is hardly any limit to the time at which some complication, such as late infection, may occur after some operative proceedings. The frequency with which complications occur will greatly influence our choice of method of treatment, since however effective a procedure may be in reducing tension, if it is not successful in retaining vision, we must discard it. In 1914, Mr. T. Harrison Butler and I set out to try and find out how the various operative methods we had employed compared as to their effects in checking depreciation of vision and reducing intra-ocular tension.*

The question of late effects was not much in our mind when we started our inquiry, but the disastrous effects, in some cases, of quiet iritis and late infection of the deeper structures of the eye soon convinced us that these late complications would assume a very important *rôle* in the estimation of the relative value of the operative procedures adopted for the relief of glaucoma. We then found it necessary to try and find out whether these late complications were inherent in all methods; whether they were peculiar to sclerectomy, and whether they were peculiar to, or more frequent with, some forms of sclerectomy than others, *i.e.*, in the sclerectomies performed by ourselves. These questions, it is evident, cannot be settled easily or hurriedly. They require a careful scrutiny of all cases before, and for a long time after, operation. From our restricted observation, however, we had no difficulty in coming to the conclusion that whatever the merits of iridectomy in arresting depreciation of vision and relieving tension, it never, in our hands, appeared to have given rise to such undesirable late effects as those which we had found after sclerectomy. Our experience is not extensive enough to form a proper estimate of the relative frequency of quiet iritis and late infection after the various methods of sclerectomy. As far as it went, it seemed to show that the punch operation was slightly worse than trephining, and the latter worse than the wedge-isolation. It is only by each operator analyzing and reporting all his operative cases that a just estimate of the relative dangers can be arrived at. It was our hope that others would have given us the advantage of their experience in this respect, but so far British ophthalmologists have been very slow in publishing their results. Continental and American surgeons have, however, given statistics which go to show that we are not alone in having had these untoward results, and it is for those who have been more fortunate to come forward with their results, so that we may form a just estimate of the relative merits of the modern operative procedures. No doubt each one will be more influenced by his own work than by that of others, but his views must necessarily be somewhat influenced by those of other workers in the same field.

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* "The Results of Modern Glaucoma Operations," see THE OPHTHALMOSCOPE, August, 1914.

As to the relative merits of iridectomy and sclerectomy, I regret to say that, owing to a variety of circumstances, I have not been able to collect and analyze my cases since 1914; but as far as I can judge from memory, my results appear to be much the same as those recorded at the Oxford Ophthalmological Congress in 1914.* It appears to me that iridectomy, whilst free from the dangers of late complications, is so nearly as effectual as sclerectomy in arresting the disease that it might be adopted as the operation of selection in all cases of glaucoma with increased tension, and that sclerectomy should only be practised when iridectomy has failed in its object. It would appear that the large conjunctival bleb, which is, or at any rate was, the acknowledged criterion of a successful sclerectomy, is a distinct source of danger, since it is easily penetrated by pathogenic organisms in the conjunctival sac, either with or without an abrasion of its surface.

The larger and more defined the bleb, the thinner its conjunctival covering, and the more patent the underlying opening in the sclera, the greater is the danger of deep infection. Patients whose conjunctivæ are very thin would probably be more liable to infection, whilst those with thicker and more loose conjunctivæ would be more favourable for trephining or the punch operation. Another factor which should be taken into consideration is the nature of the patient's work and his environment. Those who are exposed to much dust, and to such objects as are apt to abrade or infect the conjunctival sac, run increased risks of late infection.

The question naturally arises whether some of the other forms of sclerectomy give a less defined bleb, a thicker covering, and scleral opening, or openings, more microscopic in character than that of the trephine or punch. I think the wedge-isolation is a nearer approach to these requirements. The scleral opening is protected by the retained scleral wedge, the filtration area is not so pronounced, the bleb is less defined, and I have never found the conjunctiva over the scar excessively thin. Iridectomy is still more favourable, and the only trouble is that in a certain number of cases—how many it is for us to discover—the filtration may be something less than microscopic. Whether its action, apart from scleral filtration is sufficient to check the progress of the disease is also for us to determine. It seems certain that any or all of these procedures will fail in a certain percentage of cases, since they are all primarily intended to reduce intra-ocular tension, and increased intra-ocular tension is not synonymous with glaucoma. For the present, however, careful comparison of results by a large number of operators, should, after some considerable time, enable us to estimate the relative merits of the various operative procedures now in vogue.

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* [illegible] Glaucoma Operations," in THE OPHTHALMOSCOPE, August, 1914.

By E. W. Wood White, B.A., M.D.,

BIRMINGHAM, ENGLAND.

Mr. **Wood White** said that when he was a student he was taught that in performing iridectomy for glaucoma it was necessary to make a large incision in the corneo-scleral margin and to remove as much of the iris as possible. When he commenced operating he adopted this classical method, and obtained wretched results. But when E. Treacher Collins showed how essential it was to operate in such a manner that the iris was torn away close to its origin, he changed his *technique.* He now made his incision further back, and tore the iris gently away. The result of the change was that he at once began to get good results. It was not fair to judge the effect of iridectomies by citing statistics from a period when the operation was not correctly carried out.

He thought that iridectomy gave very good results in early and partially developed cases, and he always employed it in such patients, and when successful, the result was almost invariably permanent.

Long-standing cases, when there was reason to suppose that the iris root was adherent, and when the iris was atrophic, were unsuitable for iridectomy, and it was here that the modern operations should be chosen. He himself used the trephine. Subacute cases which have been going on for some time should be trephined.

The speaker pointed out that the results of sclerectomy were sometimes not permanent, even when a good filtering cicatrix had been obtained. The aperture was apt to heal up, and then the tension rose and disaster occurred. He cited a case to illustrate this point. After the failure of iridectomy we could always trephine.

By Bernard Cridland, D.O. Oxon,

WOLVERHAMPTON, ENGLAND.

Mr. **Bernard Cridland** was an enthusiastic supporter of sclerectomy. He had performed about 70 Lagrange operations, and had seen no late infections himself, but he had heard that another surgeon had had one example in an eye he had operated upon.

He considered that our attention must be focussed upon the tension. A raised tension was the all-important feature in the disease; the contraction of the fields and the failure of vision were secondary questions, but only secondary, inasmuch as they were directly the result of raised tension. When we had lowered the tension, we had done all we could do surgically, and although some cases seemed to progress even when a normal or subnormal tension had been maintained, still we were powerless to prevent this unfortunate deterioration.

He did not consider that the cases of iridectomy shown by Mr T. Harrison Butler represented the classical iridectomy. His incision had started well back in the sclera, and so the operation was a sclero-iridectomy.

By R. Beatson D. Hird, M.D., F.R.C.S. Edin.,

BIRMINGHAM, ENGLAND.

Mr. **Beatson Hird** thought that an eye with a very contracted field might be safely trephined. He had operated on several such cases, and always did a complete iridectomy through the trephine opening. He had seen considerable enlargement of the field afterwards in several cases, and could not recall one in which it had contracted further. If these patients did so well, surely trephining was the operation for glaucoma, for these cases with fields contracted up to the fixation point, or thereabouts, were most serious to deal with.

Glaucoma was fortunately rather rare in the district, as far as his experience went, and he had trephined only 18 cases of chronic primary glaucoma, so far without any ill-effects.

By P. H. Adams, M.B., F.R.C.S., D.O. Oxon,

OXFORD, ENGLAND.

Mr. P. H. **Adams** said that one of the great advantages of trephining was its reliability and innocuousness. If a patient had 6/5 vision before operation, he had a reasonable prospect of retaining this after the operation. He, personally, always did an iridectomy with all sclerectomies, and considered it an absolute essential, especially in the subacute variety.

He had a very strong feeling that there was a definite pathological distinction between chronic and sub-acute glaucoma, and that, therefore, in comparative results of various operative procedures, this fact should be kept in mind.

By Norman H. Pike, M.D., B.S.,

CHELTENHAM, ENGLAND.

Mr. **Norman Pike** said that so far the discussion had been entirely on the surgical aspect of the treatment of glaucoma. Apparently some advised operation in all cases, even those on the border line, when once the diagnosis was made. He thought that we must not lose sight of the usefulness of meiotics in suitable cases of chronic glaucoma. There were many aged persons who had a great dread of operation, and many of these were better suited by meiotics, than by operation. He has seen some very bad results follow operation upon certain aged persons at the hands of other surgeons, who had trephined when he had advised against operation. He considered that glaucoma in patients over 80 was best treated upon conservative lines.

By C. G. Russ-Wood, F.R.C.S.,

SHREWSBURY, ENGLAND.

Mr. **Russ-Wood** considered that the Elliot operation marked the greatest advance in ophthalmic surgery during the last twenty-five years. He had trephined over 70 times and had never had a late infection. He had never had such good results from iridectomy. He had seen the fields of vision enlarge after operation.

By T. Harrison Butler, M.D. Oxon,

LEAMINGTON, ENGLAND.

Mr. **Harrison Butler**, in reply said.—He fully agreed with all that Mr. **Wood White** had said, especially with regard to ancient statistics of iridectomy. He noted that many authorities cited by de Wecker had obtained good results from iridectomy. He pointed out to Mr. **Cridland** that his analysis showed two cases where operation had destroyed central fixation in a patient with a field contracted close to the fixation point. One was treated by sclerostomy, the other by iridectomy. On the other hand, he had seen such fields enlarge after operation. He thought that any operation might occasionally have this bad effect, but it was exceptional. He had always been taught that a glaucoma iridectomy should start far back, so as to clear the iridic angle. He did not perform the classical iridectomy: his object was to make a narrow or moderately broad coloboma, but to try to disengage the root of the iris. He agreed with Mr. NORMAN PIKE that great consideration was necessary before deciding to operate upon the aged for glaucoma. He mentioned the danger of insanity in glaucoma patients, and cited cases.

* * * *

A vote of thanks was given to Lt.-Col. R. H. Elliot, who was present as the guest of the Society.

CURRENT LITERATURE.

NOTE.--Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(*Fourth Notice.*)

(1) **Tarle, Jakob.—The relation between acute retrobulbar neuritis (acute axial neuritis of Wilbrand and Sänger) and multiple sclerosis. (Beitrag zur Beziehung zwischen Neuritis retrobulbaris acuta [Neuritis axialis acuta, Wilbrand und Sänger] und der multiplen Sklerose.)** *Klin. Monatsbl. f. Augenheilkunde*, April-May, 1915.

(2) **Shumway, Edward A.—Acute axial neuritis as an early symptom in disseminated sclerosis.** *Ophthalmic Record*, August, 1915.

(1) Previous researches by Uhthoff, Bruns and Stölting, Fleischer, and others have established the fact that acute retrobulbar neuritis is often an early sign of multiple sclerosis.

Tarle, of Tübingen, at the instigation of v. Schleich, sets out to investigate the more recent material of the Tübingen eye clinic, to determine how far it can be shown that already, at the time of onset of acute retrobulbar neuritis, there are other neurological evidences of concurrent disease of the central nervous system, especially multiple sclerosis

He excludes cases obviously due to local disease of the orbit, etc., and those due to toxic causes. This leaves 29 cases of acute retrobulbar neuritis. Nearly two-thirds of them were females. More than two-thirds were between 15 and 30 years of age. The average age of onset was 27 years. As a rule, no cause was assigned, but some of the patients blamed cold, over-exertion, etc. The duration of the profound loss of vision varied from a few days to four weeks. Usually there was ultimate recovery of perfect vision, but there might be reduction of central vision, colour scotoma, paracentral scotoma, or various combinations of these. The affection was bilateral in four cases, and possibly in two others.

In 11 of the cases there were nervous symptoms which, along with the eye symptoms, made a diagnosis of multiple sclerosis certain. In a number of others the diagnosis was probable.

His investigations therefore confirm the view that acute retrobulbar neuritis is an early and important sign of multiple sclerosis, and that in from one-third to one-half of the cases there is already at the time of the onset of the neuritis other evidence pointing to the existence of multiple sclerosis.

A. J. Ballantyne.

(2) **Shumway**, of Philadelphia, draws attention to the frequency of acute axial neuritis as an early symptom of disseminated sclerosis. This symptom is thoroughly recognised by ophthalmologists, but it is a question whether it is fully appreciated by physicians (judging by modern text-books). He records a case which presented signs and symptoms of venereal disease, but after seven years' observation, insular sclerosis was regarded as the cause of the initial acute axial neuritis. He discusses the symptoms, ætiology, and pathology of axial neuritis due to insular sclerosis, and concludes that in isolated occurrence of acute axial neuritis a probable diagnosis of multiple sclerosis should only be made if toxic, hereditary, acute or chronic infective processes attacking the optic nerve can be excluded.

J. Jameson Evans.

II.—ALBINISM.

(1) **Ichikawa, K.—The ophthalmoscopic appearance of the central area of the albinotic eye. (Ueber den ophthalmoskopischen Befund der Area centralis des albinotischen Auges.)** *Klin. Monatsbl. f. Augenheilkunde*, July, 1913.

(2) **Gamble, William E.—Albinism of the eyes without involvement of of the hair or skin.** *Ophthalmic Record*, May, 1914.

(3) **Gamble, William E.—Albinism in man, wth special reference to the eye.** *Transactions Colorado Ophthalmological Congress*, July, 1915.

(1) Following up the findings of Fritsch and Elschnig, that microscopic evidence of the normal macular structure is absent in albinotic eyes, **Ichikawa**, of Osaka, has examined the fundi of a number of albinos by means of the Gullstrand ophthalmoscope, and finds that there is no differentiation corresponding to the appearance of the macula and fovea of the normal eye, and that the fine vessels, instead of converging towards the central point in a regular way, meet and cross each other quite irregularly. His work therefore supports the view held by Elschnig and Fritsch. He suggests that a similar detailed examination of amblyopic eyes might in some cases reveal a similar anatomical basis for the defect.

A. J. Ballantyne.

(2) **Gamble**, of Chicago, records the case of a child, 27 months old, who had lateral nystagmus, with albinotic eyes, but whose skin and hair were normally pigmented.

J. Jameson Evans.

(3) **Gamble**, of Chicago, begins his communication by a discussion as to the chromatophores and the retinal pigment cells. The recognition that the pigment epithelium has a common origin with the rest of the retina, is of fundamental importance in the study of albinism of the eye. He then proceeds to discuss the definition of "albino" and adopts Karl Pearson's,

namely: "A complete albino is one whose skin is of characteristic pallor, or milky whiteness, whose hair is 'white,' tinged possibly with yellow or straw, and whose eyes have pink or red pupils, translucent irides, with the usual accompaniment of defective vision or nystagmus." To this Gamble would add the other eye symptom, photophobia.

Following the lead of Nettleship and Usher, Gamble regards the prognosis as good in cases of albinism of eyes alone ("partial albinism").

The microscopic examination of human albino eyes (Manz, Nettleship, Usher, Coats, and Elschnig) has been made in six instances, but we are not warranted in formulating conclusions from so small a number. On the other hand, the extensive study of albinotic eyes in animals makes the following conclusions probable:—

(1) The definition as made by Pearson is warranted by the findings, that "clinically" albinotic eyes are not, as a rule, without pigment.

(2) The all important conclusion is reached that it is reduction or loss of epithelial pigment, with a change in the structure of these pigmentiferous cells, that characterizes the albinotic eye and causes reduction in sight, with nystagmus as a resulting symptom.

(3) Regarding the function of mesoblastic pigment, it is probably true that it is to make a dark chamber, so that the image on the retina will have the proper contrast.

Ametropia and especially astigmatism is almost universally present in albinotic eyes. Photophobia is due to reduction of the amount of pigment in the eye, while nystagmus is due to reduction of sight in early life.

In the treatment of these cases it is all important to correct the error of refraction at the earliest age at which the patient can wear glasses, and this is especially true if the patient suffers from squint.

SYDNEY STEPHENSON,

III.—RODENT ULCER OF THE CORNEA.

Epalza, Enrique.—A contribution to our clinical and pathological knowledge of rodent ulcer of the cornea. (Ein Beitrag zur klinischen und pathologischen Anatomie des Ulcus corneæ rodens.) *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

This paper, by **Epalza**, of Bilbao, refers to seven eyes of five patients observed in Axenfeld's Freiburg Clinic in the course of ten years.

In one of the bilateral cases the first eye had received all kinds of treatment, but without response, and ultimately the whole cornea was opaque and the vision merely hand movements. . In the other eye no aggressive treatment was adopted. The whole cornea was affected, but the scar was so thin that this eye could count fingers at three or four metres, and the patient could see his way about and do some work. In another bilateral case one eye had been destroyed and enucleated before he reached this clinic. The other eye had an ulcer in the early stage near the corneal margin. Before treatment could be carried out, the patient acquired a diplobacillary catarrh, infiltration occurred at the centre of the rodent ulcer, and this led to a small perforation with an anterior synechia. Under the usual treatment adopted in Morax cases the whole condition, including the rodent ulcer, healed up. The author asks the question: Was it the secondary infection, or the perforation which gave the good result?

He further deals with a case in which a microscopic examination of the eye was obtained. Treatment had been unavailing, and the eye was enucleated on account of great pain. Clinically, the disease began as a limbus infiltration, resembling episcleritis, followed by the corneal ulcer. This mode of origin suggests a hæmatogenous source of infection, and the author thinks there is something to be said for Gifford's idea that rodent ulcer starts as an episcleritis and secondarily invades the cornea. Epalza admits that rodent ulcer has a great resemblance to marginal atrophy of the cornea and other conditions of a degenerative nature, and that it may even seem to develop out of these ; but he holds that rodent ulcer is inflammatory in its origin, and that it is merely superposed on these other lesions.

For details of the microscopic examination, which is well illustrated, the original must be consulted. A. J. BALLANTYNE.

IV.—A RARE TUBERCULOUS CONDITION.

Wright, Hal. R.—A rare tubercular condition of the eye. *Ophthalm. Record*, July, 1916.

This communication by **Wright,** of Columbus, is noteworthy not alone from the rareness of the condition he describes, but also from the beauty of the photo-micrographs with which the paper is illustrated.

A patient, aged 40 years, had been affected with a slightly red and elevated spot on the limbus of one eye for about three years. When seen by

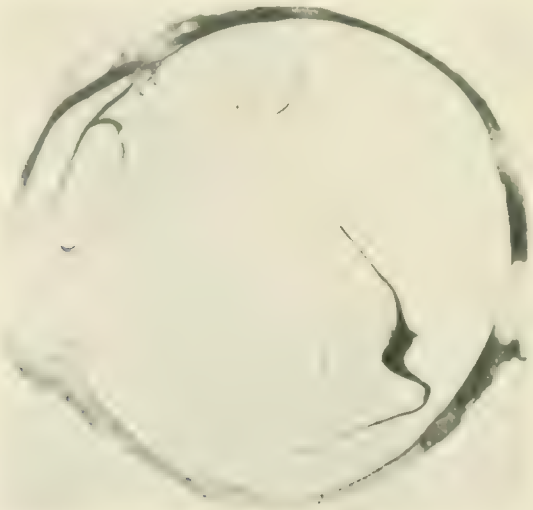

Fig. 1.

Wright, a staphyloma 2.5 mm. high and 3 mm. at the base was present at the sclero-corneal border of the left eye at a spot which would be represented on the clock dial by 5 o'clock. The staphyloma was opened, when the clear aqueous issued, draining the anterior chamber. Between June, 1913, and October, 1914, several interventions were undertaken. For example, the staphyloma was dissected out and its edges were cauterized ; it was dissected off ; repeated paracenteses were performed. By October, 1914, the mass, of dark colour, measured 8 mm. long by 6 mm. broad by 3·5 mm. high. A tentative diagnosis of melanotic sarcoma was made. The eye was removed shortly afterwards. The photo-micrograph (Fig. 1) showed that it was a true staphyloma and not a neoplasm located at the sclero-corneal border. Its position might be described as intercalary. The detachment of the retina shown in the photo-micrograph had occurred after enucleation. Its external surface was covered with stratified squamous epithelium, and its internal surface by adherent iris. The posterior base of the staphyloma was very thick and gradually became thin as it passed forward to be continuous with the cornea. The substance of the staphyloma, which showed many areas of infiltration, was of connective tissue.

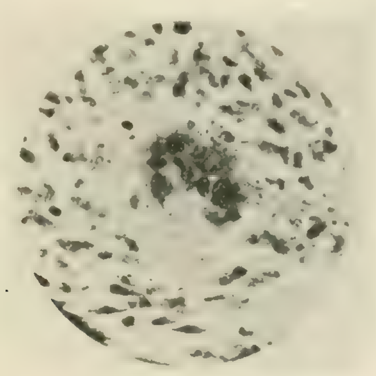

Fig. 2.

The infiltrated areas in the sclera had more or less tendency to coalesce. One of them was composed of lymphocytes, and the other of epithelioid cells with a varying number of small round cells scattered among them. In some of these areas, giant cells were found. The photo-micrograph (Fig. 2) shows the giant cell, with some degeneration of its cytoplasm, surrounded by endothelial leucocytes and a few lymphocytes.

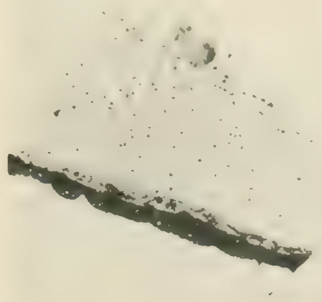

Fig. 3.

The next photo-micrograph (Fig. 3) shows an early tubercle located on the anterior surface of the iris, 1 mm. out from the ligamentum pectinatum. There is a giant-cell, the cytoplasm of which shows some degenerative changes. This is surrounded on the iris side by endothelial leucocytes and a few lymphocytes. Further out in the iris, towards the pupillary border, several tubercles were found. SYDNEY STEPHENSON.

V.—MEGALOCORNEA.

(1) **Kayser, B.—Megalocornea or hydrophthalmos? (Megalokornea oder Hydrophthalmus?)** *Klin. Monatsbl. f. Augenheilkunde*, February, 1914.

(2) **Seefelder, R.—The relations of so-called megalocornea and megalophthalmus to hydrocephalus congenitus. (Ueber die Beziehungen der sog. Megalokornea und des sog. Megalophthalmus zum Hydrophthalmus congenitus.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) **Kayser**, of Stuttgart, gives a family tree comprising six generations, in which seventeen persons showed the condition which he regards as megalocornea. The abnormality is congenital. There is great enlargement of the cornea and the iris, the anterior chamber is clear and deep, the vision is good and stationary, tension is normal, and there is no excavation of the optic nerve. The patients are healthy and without other defects; but in some patients other conditions, such as glaucoma and luxation of the lens, come on at a certain age, and these may be related to the congenital defect.

The author concludes that there is a true megalocornea apart from hydrophthalmos, that it is hereditary, passing by the same method or inheritance as colour blindness and family optic atrophy, and that consanguinity of the parents is a cause. A. J. BALLANTYNE.

(2) **Seefelder,** of Leipzig, holds that there exists, apart from hydrophthalmic enlargement due to rise of intra-ocular pressure, an enlargement of the eye not resulting from a dilating force, but the result of abnormal development. In the rare cases of this group the facts which negative the idea that stretching is the cause are: 1. Absence of corneal opacity or tears in Descemet's membrane. 2. Absence of widening of the limbus in spite of enlargement of the anterior part of the eye. 3. Sharp definition of the corneo-scleral border. 4. Normal appearance of the sclera in the region of the anterior chamber. 5. Absence of optic nerve excavation. 6. Absence of functional disturbance, apart from optical error. 7. Presence of a relatively high regular astigmatism, not against the rule, as in hydropthalmus. 8. Radius of curvature of the cornea shorter than normal. 9. Normal tension as recorded by tonometer. 10. Absolute correspondence in the proportions of the two eyes, whereas in bilateral hydrophthalmus there are usually well-marked differences. A. J. BALLANTYNE.

VI.—REMEDIES.

Sixth Notice.

(1) Stengele, Udo.—The use of optoquin in various external diseases of the eye. (Ueber die Anwendung von Optochin bei verschiedenen ausseren Augenerkrankungen.) *Klin. Monatsbl. f. Augenheilkunde*, April-May, 1915.

(2) **Skramlik, Emil von.—Argyrosis of the lacrymal sac. (Argyrose des Tränensackes.)** *Klin. Monatsbl f. Augenheilkunde*, April-May, 1915.

(3) **Terry, Robert J. and Wiener, Meyer.—The mydriatic action of dextro-hyoscyamin.** *Transactions Colorado Ophthalmological Congress*, 1915, p. 73.

(4) **Jones, E. L.—The arrest of cataract at an early stage.** *Ibidem*, p. 142, and *Annals of Ophthalmology*, Vol. XXV, No. 1, January, 1916.

(5) **Jones, E. L.—Massive sub-conjunctival injections of cyanide of mercury in dangerously injured or infected eyes.** *Transactions of the Twentieth Annual Meeting American Academy of Ophthalmology and Oto-Laryngology*, 1915, p. 200.

(6) **Wyler, Jesse S.—The use of optochin in external eye diseases, excluding pneumococcic infection.** *Trans. Twentieth Annual Meeting American Academy of Ophthalmology and Oto-Laryngology*, 1915, p. 192.

(7) **Weidler, Walter Baer.—The present status of tuberculin therapy in ocular tuberculosis.** *Ophthalmology*, January, 1916.

(8) **Heckel, Edward B.—Preliminary report of a new method of treating gonococcic purulent conjunctivitis by the exclusive use of iced normal salt solution.** *Pennsylvania Medical Journal*, April, 1916.

(9) **Miller, G. Victor.—Sympathetic ophthalmia unsuccessfully treated with organic arsenic compounds.** *British Medical Journal*, 29th July, 1916.

(1) **Stengele,** of Bremen, tells us that in the Bremen Eye Clinic, optoquin is employed (1) in eye diseases caused by the pneumococcus, (2) in diseases of the tear sac, (3) in certain eye diseases associated with photophobia.

In the present paper he describes its use in two cases of typical pneumococcal ulcer of the cornea, one case of pneumococcal conjunctivitis, three of lacrymal sac disease, and fourteen cases of different kinds with photophobia. Most of the latter were strumous ophthalmia. In most conditions one per cent. drops were used. In photophobia cases the drops used were five per cent. (always preceded by cocaine), and in the sac cases, irrigation was used as well as instillation of drops. A. J. BALLANTYNE.

(2) **Skramlik,** of Freiburg, saw a patient who used 1 per cent. colloidal silver continually for three weeks, and off and on for seven months. There was discoloration of the whole conjunctiva. The lacrymal sac, which was excised on account of blennorrhœa, was also stained. The author describes the microscopic appearance of the affected tissues. The case is another object lesson in the danger of allowing the use of silver preparations for an indefinite period without supervision. A. J. BALLANTYNE.

(3) Some years ago it was found by **Terry** and **Wiener**, of Washington, that dextro-hyoscyamin, when dropped into the conjunctival sac, dilated the pupil fully and had very little or no effect upon the accommodation. A half per cent. solution of dextro-hyoscyamin caused a dilatation of the pupil from a width of 4½ mm. to 8 mm. in about 40 minutes. The accommodation was disturbed very slightly in most cases, and in some not at all. The dilatation lasted, on the average, about 12 hours. Experiments showed that when

the accommodation suffered, the solution was not perfectly fresh, the dextro-hyoscyamin rapidly changing to the laevo-rotary form when in solution, and affecting the accommodation like atropin. The authors at first corrected this by keeping one quarter of a grain of dextro-hyoscyamin powder in a one drachm bottle, and filling the latter with water at the time of using. But the remedy is now put up by Burroughs, Wellcome, & Company in tabloid form, each containing one three-hundredth of a grain. One objection to the tabloid, which does not apply to the solution, is that the first-named causes a rather severe burning sensation for about a minute after being introduced into the conjunctival sac. Dextro-hyoscyamin is said to dilate the pupil much more quickly and effectively than euphthalmin.

SYDNEY STEPHENSON.

(4) **Jones,** of Cumberland, has been encouraged by Lt.-Col. Smith's work on subconjunctival injections in the treatment of early cataract, again to put forward his own favourable experience in the same direction.

He claims that by the use of dionine drops, or by the injection of a solution of cyanide of mercury subconjunctivally, an artificial sclerosis of the nucleus of the lens can be brought about, and that this is associated with a disappearance of the fine dust-like opacities in that part, and with a corresponding improvement of vision. Jones uses 8 grains of dionine to the half ounce of a solution of 1/1000 of cyanide of mercury, and places 3 drops of this solution in the eye every night.

R. H. ELLIOT.

(5) It is widely known that **Jones**, of Cumberland, advocates massive, subconjunctival injections (*see* THE OPHTHALMOSCOPE, 1914, p. 374). He devotes the present communication to recommending such injections in practically all dangerously injured or infected eyes. His aim is to establish a maximum normal physiologic reaction, and he believes that Nature does the rest. Hence, the particular chemical or dosage is not a matter of great importance. Jones has employed massive injections for eleven years, without doing any mischief, unless adhesion of the conjunctiva to the eyeball over a small area surrounding the needle prick be counted as such. The dose for injection is 2 cc. of a 1 in 1500 cyanide of mercury, in which is dissolved about one-eighth grain each of acoin, morphia sulphate, dionin, boric acid, and a little salt. Children are given as large injections as adults. The eye should be cocainized very thoroughly. When faced by painful conditions, as iritis or irido-cyclitis, $\frac{1}{4}$-grain of morphia is used.

The immediate results of the treatment are sometimes alarming to the uninitiated. Pain, it is true, seldom lasts for longer than fifteen minutes, but the lids and side of the face are apt to become swollen and painful for some time after the injection has been made.

Some of Jones' cases are of a very striking nature, and should be read in the original.

SYDNEY STEPHENSON.

(6) **Wyler,** of Cincinnati, has employed optoquin in external diseases of the eye, and speaks highly of it in spring catarrh, the cicatrical stages of trachoma, and phlyctenular disease. On the other hand, he believes that the drug is contra-indicated in interstitial keratitis. In two cases of gonorrhœal ophthalmia (one in a baby and the other in an adult), the result left much to be desired. It should be added, finally, that Wyler used the hydrochloride salt.

Discussion.

Gradle, of Chicago, suggested that some of the unfavourable results, referred to by Wyler, might be due to the use of the solution of optoquin employed.

Reber, of Philadelphia, had had ideal results from optoquin in acute pneumococcic conjunctivitis.

Green, of St. Louis, thought too much dependence might be placed upon optoquin, especially as regards surgical measures.

Weiner, of St. Louis, had had splendid results in gonorrhœal ophthalmia.

Bissell, of Rochester, had had an excellent result in a case of gonorrhœal ophthalmia. SYDNEY STEPHENSON.

(7) **Weidler**, of New York, gives in this paper his impressions of tuberculin therapy as gathered from the treatment of 117 cases in the course of three years. There were cases of disease of the conjunctiva, sclera, cornea, iris, ciliary body, retina, and choroid. He claims that in all except one of the cases giving a positive tubercle reaction, he was able to stop the progress of the ocular lesion by tuberculin. He believes that phlyctenular eye conditions are not due to the direct action of the tubercle bacillus, but to a tuberculous toxin Very satisfactory results are obtained by tuberculin. Generally speaking, he is of the opinion that a positive tubercle reaction is a strong indication for tuberculin treatment. A number of illustrative cases is given. A. J. BALLANTYNE.

(8) **Heckel**, of Pittsburgh, advocates treatment of gonococcal ophthalmia by means of iced normal salt solution. The liquid is run over the eyelids and into the conjunctival sac, and between the flushings (which are repeated about every six hours), iced pads are applied continually.

He reports three cases only, but is convinced that in iced normal salt solution we possess an actual specific in the treatment of gonococcal conjunctivitis, both in infants and adults.

Discussion.

Stieren, of Pittsburgh, intended to try Heckel's plan when a suitable case presented itself, not departing, however, from his usual custom of dividing the external canthus, in order to allow better eversion of the lids and to relieve pressure on the eyeball. **Blair,** of Pittsburgh, commented upon the bacteriological investigation of ophthalmia neonatorum. Thirty per cent. to forty per cent. of the cases in which the laboratory report stated that the smear contained Gram-negative diplococci, recovered promptly, while the other cases, with a similar bacteriological report, ran through a course which varied from five to seven weeks. He has, therefore, reached the conclusion that the cases in which recovery is prompt are due to the *Micrococcus catarrhalis*, whereas the others are due to gonococci. Otherwise expressed, he does not feel that we are justified in pronouncing a case as true gonorrhœal ophthalmia on the simple findings of a stained smear. The diagnosis can be positively made only after a careful study of the morphology of the organisms present. SYDNEY STEPHENSON.

(9) **Miller,** of Middlesbrough, reports a case of sympathetic ophthalmitis unsuccessfully treated with organic compounds of arsenic.

First, 0.6 gramme of kharsivan was injected into the muscles of the buttock, and this application was repeated on two occasions. Secondly, 0.3 grammes of galyl was given by the veins, as a consequence of which the patient, aged 49 years, wellnigh lost his life. Notwithstanding this mischance, a second intravenous injection of 0.4 gramme of galyl was administered after an interval of twelve days. Other general treatment included grey powder, sodium salicylate, and hot baths. Locally, atropine and cocaine were used.

To quote Miller's words, " the result in this case does not appear to confirm the optimistic views as to the results of the use of arsenic compounds in the treatment of sympathetic ophthalmia, but it may be that the treatment was commenced too late, and perhaps the injection of 'hyposol' (an oily emulsion of kharsivan) is not so efficient as an intravenous injection."

SYDNEY STEPHENSON.

BOOK NOTICES.

Transactions of the Colorado Ophthalmological Congress. Held under the auspices of the Colorado Ophthalmological Society in Denver, Colorado, July 22nd and 23rd, 1915. Denver: Published by the Society, 1915.

This paper-backed volume of two hundred and eight pages, which reached us quite recently, represents the proceedings of the Colorado Ophthalmological Congress, held at Denver on July 22nd and 23rd, 1915 The Congress itself, which was held under the auspices of the Colorado Ophthalmological Society, appears to have been based on the lines that have proved so successful at Oxford, England. The volume (sparingly illustrated) includes nineteen papers, four accounts of cases, and a description of certain instruments. From every point of view it is to be regretted that the *Transactions* is not provided with an index and a table of contents.

SYDNEY STEPHENSON.

Transactions of the Twentieth Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology. Held at Chicago, Ill., October 5th, 6th, 7th, 1915. Published by the Academy.

This cloth-bound volume, which reached us in June last, represents the meeting of the American Academy of Ophthalmology and Otology at Chicago, Ill., on October 5th, 6th, and 7th, 1915. Rather more than one-half devoted to the ophthalmic division, and the rest to oto-laryngology. The volume is fairly illustrated. Those of its ophthalmic contents that are suitable will be abstracted in our columns in due course.

SYDNEY STEPHENSON.

Sight Testing made Easy. By W. WRIGHT HARDWICKE, M.D., St. And., etc. London: J. & A. Churchill. 3rd edition. 1916. 2s. 6d. net.

This small manual has much to recommend it to the student of refraction. it is clearly and simply written; its information is excellently paragraphed; and its headings are emphasised by the judicious use of suitable type. The paper and printing are good, and the illustrations are well executed. Mistakes in spelling are few, but the use of "stenopaic," instead of "stenopæic," is an innovation which one would like to have seen justified by a reference to the original Greek. The first sentence of paragraph 69 is not up to the author's standard, and calls for revision, if the student is to understand his meaning. Many of the items of advice given will meet with hearty endorsement at the hands of experienced ophthalmologists, although in a subject which allows of such wide latitude as that of refraction does, there are bound to be individual points which will be challenged, *ex. gr.*, the statement that "one-third only of the correction should be given for the *latent* hypermetropia discovered under atropine." As it stands, the rule is far too hard and fast. Again, under the *symptoms of myopia*, will be found set down entoptic phenomena and metamorphopsia, which should rather be attributed to the complications of the condition than to the myopia itself. The statements that "glaucoma is most common in hyperopic eyes," and that "myopes enjoy an almost complete immunity from glaucoma," are not in accordance with the most modern trend of thought on the subject. Priestley Smith was one of the first to challenge the correctness of the statistics on which this view was founded. Gilbert found in the Munich clinic that of 71 cases of simple glaucoma, 62 per cent. were myopic or emmetropic, and 38 per cent. hyperopic; whereas, of 115 cases of congestive glaucoma, 77 per cent. were hyperopic, the remainder being equally divided between myopes and emmetropes. Again, Lange found that 43·3 per cent. of his cases of simple glaucoma occurred in myopes, and Löehlein's researches led him to believe that that the myope is just as liable to glaucoma as the emmetrope or hyperope. His figures showed that there is a very close relationship between myopia and glaucoma in the young. In this he was supported by Haag's statistics from the Tübingen clinic, for that writer found that myopia was present in a larger percentage of his cases of simple than of congestive glaucoma. Fuchs, in his earlier editions, wrote, "a disposition toward inflammatory glaucoma appears to belong principally to hypermetropic eyes, whereas strongly myopic eyes are to be regarded as having almost complete immunity against the disease"; but in his twelfth enlarged edition (German) he has omitted the above statement, and has evidently been convinced that it requires drastic modification.

"For those whose distant vision is —4D. and upwards, two-thirds less power in the concave lens should be provided for reading." Does the author mean two-thirds of the power ordered for distance, or are we to take the statement literally, as it stands? Again, "there are two principal meridians in astigmatism, *always at right angles to each other*." Are the words underlined a statement of fact? We think many ophthalmologists will say they are not, and that some of the most difficult cases met with fall in the category of the exceptions to this rule. It would be impossible to take up the book in any detail, and to discuss the many statements made, which are open to two or more opinions, but the writer feels that the main criticism of the work will be on the lines of the general principle, that too much attention is devoted to subjective examination, and too little to the methods of objective examination. The latter is dealt with at the very end of the book, and gives the impression that it is deliberately relegated to a position of secondary importance. In the reviewer's opinion much more stress should be laid on the wide use of cycloplegics, on retinoscopy with the undilated pupil, and on the difficulties and pitfalls which attend the reconciliation of cycloplegic and post-cycloplegic results, on the use of the astigmometer, and on the routine examination of the media and of the choroid and retina. Subjective examination is the court of final appeal, in a measure greater than Dr. Hardwicke appears to allow for, but judgment should only be passed after every scrap of available evidence has been marshalled and considered.

In conclusion, it only remains to repeat that the book is one which any intelligent student of ophthalmology will read with both pleasure and profit.

R. H. ELLIOT.

NOTES AND ECHOES.

Appointments

Mr. R. S. Charsley has been appointed acting assistant surgeon to the Royal Westminster Ophthalmic Hospital.

Dr. Clements Hailes has been appointed medical adviser to the Local and General Munitions Tribunals for Bristol (including Weston-super-Mare, Bristol, Avonmouth, Radstock, Bridgwater, Glastonbury, Cheltenham, Gloucester, Sharpness, and Dursley.)

Dr. J. Chaillous has been nominated *médecin chef de service* at the Quinze-Vingts, Paris.

* * * *

How the Law Regards the Loss of One Eye.

It is a much debated question whether the Court, in considering what is or is not suitable employment for a one-eyed workman in cases where the employer wishes to cease payment of the man's compensation money, ought to have regard to the specially serious consequences to him of the possible risk of an accident which may result in his becoming completely blind through an injury to his remaining eye. The judges have been far from unanimous in their opinion, their divergent views being well illustrated by the opinions respectively given in one of the cases by Lords Justice Buckley and Fletcher Moulton. The former said, "I do not myself accept that it would be a good reason to assign that having lost one eye the loss of the second would be of greater import to the man in question than to any other man. Of course it would be, but I do not think that is relevant upon the question of suitability." On the other hand, the latter judge remarked, "In my opinion you cannot consider an employment suitable that a reasonable, careful man desirous of earning his living is entitled to reject because it exposes him to risks so serious in their consequences that he feels he is not doing his duty to himself and his family in encountering them." We regret to see that the more recent judicial opinions are inclining in the direction of Lord Justice Fletcher Moulton's view.—*The Hospital*, August 5th, 1916.

* * * *

Standard Vision.

We would call the attention of our readers to a little article in Jackson's *Ophthalmic Literature* for June, 1916. It is presumably by the editor himself, since there is no signature, and deals with the term "standard vision." Every ophthalmologist knows, if he cares to think about it, that "normal vision" is a misleading term, since it may mean any one of several things. It would be better, as is here suggested, that the term "standard vision" should be used when conformity to a certain definite standard is meant. Thus, $V=\frac{6}{6}$ is "standard vision," although it may not be "normal vision" under the particular conditions in which the test is made.

* * * *

Recovery from Blindness.

Recovery from Blindness due to cerebro-spinal meningitis. At a meeting of the Société Médicale des Hôpitaux of Paris, M. Arnold Netter discussed the possibility of recovering from blindness due to cerebro-spinal meningitis, even when accompanied by ocular lesions. One case is related in full and two others are referred to.—*Lancet*, June 24th, 1916.

* * * *

Royal College of Surgeons of England.

We are glad to announce that Colonel R. H. Elliot has been appointed a Hunterian Professor. The lectures will be delivered at 5 p.m. on February 19th and 21st 1917. The subject selected is, "The Indian Operation of Couching for Cataract," illustrated by lantern slides.

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	1916.	
American Academy of Ophthalmology and Oto-Laryngology.	Dec. 11th, 12th, and 13th, 1916	Memphis, Tenn.
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ORIGINAL COMMUNICATIONS.

ASSOCIATION OF FAMILIAL DISEASE OF THE NERVOUS SYSTEM AND OF THE EYE.*

BY
F. E. Batten, M.D., F.R.C.P.
LONDON, ENGLAND.

Introduction.

THE association of familial diseases of the nervous system and of the eye is well recognised, and as well-known examples of such may be mentioned, Friedreich's hereditary ataxia with nystagmus; hereditary cerebellar ataxia with optic atrophy; family amaurotic idiocy; and familial ophthalmoplegia. Of greater rarity are familial cataract associated with myotonia atrophica, and the eye change with aplasia axialis extra-corticalis congenita (Pelizæus-Merzbacher disease).

It is not my purpose to deal with these, but in the time at my disposal to limit my remarks to a form of cerebral degeneration associated with changes at the macula seen in several members of a childship. Though the clinical features and the ophthalmoscopic changes differ somewhat from those seen in the Waren Tay-Sachs disease, yet the pathological changes of the central nervous system, and I may add of the ganglion cells of the retina, as shown by Mr. M. S. Mayou, are so similar, that it seems to me probable that they are one and the same disease, but occurring at somewhat different periods of life.

I propose to place before you:—

(1) The clinical and familial features of the disease.
(2) The ophthalmoscopical appearance.
(3) The pathological changes

(1) The Clinical and Familial Features.

The children are born healthy and develop normally to a period of life varying with the different families.

They then begin to show, first, loss of intellectual faculties; secondly, loss of vision; and, thirdly, loss of motor power. The disease slowly progresses, eventually rendering the child blind, demented, and spastic. The family characteristic of the disease is best shown by the pedigree trees. The disease is neither sex nor race selective.

(2) The Ophthalmoscopic Appearance.

The disc is a grey-white colour, with vessels of nearly normal size.

At the macular region there is a diffuse pigmentation. The pigmentation extends to a more or less extent into the retina around.

(3) Pathological Appearance.

The configuration of the brain appears normal; in advanced stages there may be some wasting of the convolutions, but practically the surface and membranes show no change. No macroscopical abnormality can be detected in the brain substance on section.

[illegible]

On microscopic examination, the most marked pathological change is a primary degeneration in the pyramidal and Betz cells of the cortex and the Purkinje cells of the cerebellum.

The changes in the macula consist in a degeneration of the ganglion cells, and a migration of the retinal pigment.

A detailed description of the pathological changes will be found in *Proc. Roy. Soc. of Med.* (Ophth. Sect.), 1915, Vol. VIII, p. 70.

Conclusions.

It is clear from a consideration of the above cases and their pathology, that there is a group of cases similar to the Waren Tay-Sachs family amaurotic idiocy occurring at a later age, and not race selective. The disease is characterised by progressive blindness, progressive paralysis, and progressive dementia; but the changes at the macula are not always present, and, when present, are in some cases a late manifestation, in others an early manifestation of the disease.

The later in life the disease appears the less acute seems to be the course, and in those cases in which the visual defect manifests itself during or after the second decade of life, there appears to be little or no liability for the central nervous system to be affected. The parallelism of the clinical symptoms with the Waren Tay-Sachs cases is clear. The agreement lies in (1) the familial character; (2) the absence of syphilis; (3) the clinical symptoms and course. The difference lies in (1) the absence of race proclivity; (2) the absence of the characteristic macular change; (3) the difference of age.

What the nature of the poison may be, which is so selective in its mode of action, and tends to affect several members of a childship, is a problem yet to be solved, for neither the exhaustion theory of Edinger nor the abiotrophy theory of Gowers helps to throw light on the condition.

My object in bringing this subject before the Congress is to enlist the interest of ophthalmic surgeons, especially those dealing with schools and institutions for mentally defective children. For I feel certain that a careful study of the fundus would bring to light several cases of this affection which lie buried in the institutions for the mentally defective under such vague titles as "general paralytic" and "dementia."

IRIDECTOMY IN GLAUCOMA.

BY

R. H. ELLIOT, M.D., F.R.C.S.,
LT.-COL. I.M.S. (RETIRED),
LONDON, ENGLAND.

FROM the date of the first introduction by von Graefe of the operation of iridectomy for the relief of glaucoma, the merits and demerits of the procedure have been constantly under discussion by ophthalmologists. From time to time the dispute has died down in intensity, only to flare up afresh under the influence of some zealous advocate of the method. At the present time we appear to be in the midst of one of these periodical outbreaks, and it therefore behoves us to consider the whole question carefully and impartially.

No one who reads the large amount of literature now appearing on the subject can fail to be struck by the fact, that an enormous majority of those who write and speak on it lay very little stress on the magnificent work of the past masters of our craft. To ignore or even to undervalue the work of those, who laid sure and strong the foundations of ophthalmology, would be a mistake in the consideration of any subject, and a very great one indeed in this. For these men worked and wrote under the spell of the enthusiasm cast by von Graefe's great discovery, in the first red dawn of the conquest of glaucoma. There were then few ophthalmic surgeons in the field, and operative practice was concentrated in the hands of those few, to the benefit of their surgical skill, and to the multiplication of their professional experience. One point more, and no light one, iridectomy had no serious rival in the field, and reigned a practically undisputed mistress in the domain of glaucoma therapy. It is for these reasons that we shall begin our study of the question before us with the cry "Back to the Old Masters!" Those who have read, or who will read, patiently what von Graefe, de Wecker, Bowman, and many another giant of the past had to say on the clinical side of the subject, are bound to rise from their task in a chastened and humble frame of mind. It is true that so far as concerns pathology, these makers of ophthalmic history were dimly groping their way toward the light of a day which has since broken so fully that the youngest student may learn and clearly understand the facts toward which von Graefe faintly stretched his faltering hands; but when it comes to clinical observation, the ablest surgeon of the XXth Century may gratefully and profitably learn from the men whose names, now but an honoured memory, were household words in his childhood, or before his birth.

We shall begin with von Graefe. What was his actual attitude towards the advocacy of iridectomy? It may be summed up in a few short sentences:

(1) The results obtained are in all cases in direct proportion to the promptitude with which the operation is performed.

(2) The more marked the signs of intra-ocular pressure, the better the expectation of a happy result, and *vice versa.*

(3) Even when iridectomy offers the least prospect of success, it still remains the surgeon's best hope.

To deal with his views more at length. His all too short experience showed him that the uncertainty of the results obtained by iridectomy, in the later stages of glaucoma, was so absolutely opposed to the completeness and durability of the benefits obtained by surgical interference at the earliest possible moment, that he says "the advice to operate immediately and without hesitation cannot be too urgent." Again, "the degree of recovery essentially depends on the length of time the eye has already been affected, and not simply on the condition of the symptoms," and so on all through his writings. Indeed, he went further than many surgeons are prepared to go to-day, for he advocated most strongly that the operation should be performed in what was then, and we fear is still too often now, regarded as the premonitory stage of the disease. To this recommendation he adds the curious rider that the operation should be undertaken at this stage, "when the other eye has become blind from the same affection."

The qualification is the more extraordinary since it was von Graefe himself who laid down that the existence of "the premonitory stage can never with certainty be denied in the second eye" when the first is severely affected, since the signs and symptoms in the latter overshadow those in the former, and so make them difficult for the patient to recognise.

There can be little doubt that had von Graefe lived longer, his keen mind would have swept away the artificial and deceptive distinctions, which have been built up between the so-called premonitory and actual stages of glaucoma, and would have launched his operative interference for the first eye as well as for the second at the earliest possible moment. Such would have been the logical evolution, and von Graefe was always logical, of the mind-workings of the man who wrote "iridectomy is obviously most successful during the premonitory period.—The result is still more perfect than when it is performed in the inflammatory stage, soon after the disease has broken out.—The ultimate acuteness of vision very much depends on the period at which the operation is performed."

He was led in the first instance to these conclusions by observing that when he had occasion to operate at one sitting on the two eyes of a patient, in whom the attack of glaucoma had come on in one eye sooner than in the other, it was invariably the eye with the shorter history of the disease, that gave the better result. We shall have many occasions to return to this dictum of von Graefe's. If he had given the world nothing else, he would not have lived in vain. Through all the long years of the half-century that has elapsed since his great work on glaucoma began, the dominant theme in all that has been written on the subject is contained in the two words "operate early." Timid and cautious men have shrunk from the advice, but we believe it remains to-day the clarion call of glaucoma surgery.

The next point, which we must take up and elaborate a little, is that of von Graefe's experience of iridectomy in the more chronic as compared with the congestive forms of glaucoma. Here, again, we shall as far as possible give his own words. He says "symptoms of increased pressure are in favour of the performance of iridectomy since this operation favourably influences cases with high tension," and, again, "the more distinct the symptoms of increased pressure are at the time of operation the more *ceteris paribus* may be expected from iridectomy."

Of the results of iridectomy in congestive glaucoma he speaks in glowing terms, but his tone is much less hopeful, when he comes to deal with those obtained by operative measures undertaken for the relief of the chronic form of the disease. This is repeatedly shown throughout his writings, as the following extracts will show. "Iridectomy exerts a temporary favourable influence even in chronic glaucoma; since this therapeutic action is at all events superior to the curative effect of any other method of treatment, it is our duty to continue it." And again, he says of iridectomy in chronic glaucoma, "it is indicated, so long as any considerable amount of vision remains, though in many cases negative results, and in others only temporary ones, will be obtained."

There is one very important fact, which must never be lost sight of, *viz.*, that the great master ruled outside the pale of glaucoma a large number of cases which we to-day would unhesitatingly place in the simple chronic group. On this subject he says "I never observed any special curative action of iridectomy in amaurosis with excavation of the optic nerve." Those who have studied his writings will probably have little difficulty in agreeing that under this heading were confused two great groups of cases (1) that of the simple chronic glaucomas and (2) that of cases of optic atrophy with shallow cupping of the nerve head. von Graefe's classification of glaucoma had not attained the precision of ours of to-day. When he spoke of chronic glaucoma, he would appear to have included a number of cases with subacute exacerbations, and he undoubtedly excluded a large number of those which we should now unhesitatingly include. Only quite recently have ophthalmologists recognised that there are cases of indisputable pathological high tension, which are hidden from digital examination and revealed only to the tonometer. The writer further believes that as time goes on, the view will gain ground that even the most chronic cases have their ups and downs, which are dependent upon vascular storms identical in quality, although widely different in intensity, from those which mark the periodicity of unquestionably congestive cases. At a time when writers are to be found who suggest that iridectomy may be as valuable in chronic as in acute glaucoma, or even more so, it is important not merely to bear in mind what von Graefe said of the success of the operation in the two classes of cases, but also to remember carefully, that his group of chronic glaucoma was a much more limited one than our own.

From the writings of von Graefe, the distinguished introducer of iridectomy for glaucoma, we turn to a consideration of those who were his contemporaries, or who worked shortly after his death. Of these one man stands out pre-eminent, not merely because he was admittedly one of the greatest ophthalmologists of his time, but still more because he was at once the ablest and the most ardent of the partisans whom von Graefe gathered to his standard. His monograph in defence of iridectomy stretched to nearly 200 pages of closely written matter, and is one of the most valuable contributions that has ever been made to the subject of glaucoma. To the writer it seems that de Wecker first undertook his task with a confidence and an enthusiasm, which could not fail to be modified by the tenor of the remarks made in reply to his queries by 112 of the most famous ophthalmic surgeons then living. In those enquiries de Wecker limited himself to the action of iridectomy in simple chronic glaucoma. Before turning to consider what his correspondents had to say, it seems expedient to begin by studying de Wecker's own conclusions. These may first shortly be stated.

(1) As to the time of operation, he repeatedly endorsed and urged von Graefe's advice "the sooner the better." Like his master, he felt the great difficulty of deciding what cases were to be included in the category of simple glaucoma, and he was likewise disposed to exclude a class of case, which we would now unhesitatingly accept as glaucomatous.

(2) Much as he valued treatment by meiotics, he thought it doubtful whether their introduction had not done more harm than good, since it had led surgeons to delay the time of operation. He went on to say "if meiotics have never cured a case of glaucoma, they have prevented many glaucomatous patients from being cured."

(3) He was a firm believer in the value of general treatment, but only as an accessory to operation, and he went so far as to say that it would become dangerous if it were allowed to delay operative treatment.

(4) With von Graefe, he believed that the more acute the form of glaucoma, the better were the results obtained, but he was clearly disposed to attribute the comparatively little success, which attended iridectomy in chronic cases, to the late period at which operation was so often undertaken in them.

(5) It is the crown of de Wecker's glaucoma work, that he appreciated and insisted on the important *rôle* played by the filtering cicatrix in iridectomy cases. von Graefe had observed that a typical filtering cicatrix could be seen after iridectomy in one case in every fifteen, and that "sufficiently marked filtration" could be demonstrated in one case out of every five; but, although the possibility that this might be of importance had not escaped him, he had failed to discern its true significance. It was left to de Wecker to bring the filtering cicatrix before the profession as an objective of surgical therapeutics. That he did so must ever redound to his credit.

(6) In his concluding pages, he advocated a combination of sclerectomy and iridectomy as being of more value than either operation alone.

(7) He practically adopted von Graefe's defence of the method, which was that in the absence of some better method of treating glaucoma, it was the surgeon's duty to perform an iridectomy.

These last two points seem to the writer to be deserving of the most careful consideration at a time when surgeons are to be found who advocate a surrender of the filtration operations and a return to iridectomy. Let us not forget that the two greatest men of the "iridectomy period," laid stress on the fact that there was then no other alternative available, and that it was therefore the duty of the surgeon to use the operation *faute de mieux* and let us ponder deeply over the fact that the one to live latest (de Wecker) closed his ardent defence of iridectomy, by 'hedging' on a combined sclerectomy and iridectomy.

Of the 112 surgeons who replied to de Wecker, 11 did not do iridectomy, 19 had given it up owing to bad results, 10 more had practically done the same; 23 continued to do it *faute de mieux*, in spite of unfavourable results; 17 more continued to do it, although they would not commit themselves to any definite opinion as to the value of the method; 3 gave no indication of any kind as to their opinions, beyond stating that they performed the operation; 6 surgeons, who did not give statistics, reported favourably of the operation; 23 (or 20·5 per cent.) furnished more or less definite statistics. Dividing their results into four categories, and counting all doubtful cases as favourable, we find that 6 recorded good results in from 0 to 25 per cent. of their cases; 5 more in from 26 to 50 per cent.; whilst 8 claim good results in from 51 to 75 per cent., and 4 in from 76 to 100 per cent.

To sum up.—Of 112 surgeons, 74, or 66 per cent., appear to have formed a low opinion as to the value of the method; 20, or 17·85 per cent., were entirely non-committal; and 18, or 16 per cent., were in favour of the operation. This statement of the case cannot fail to move the careful surgeon to earnest thought when the importance of the subject is taken into consideration.

As one reviews the statements made in the disfavour of iridectomy, and considers that amongst those who obtained poor results are to be numbered men of such outstanding eminence as Axenfeld, Barraquer, Chevallereau, Deutschmann, Dujardin, Galezowski, Krucow, Lapersonne, Panas, Schmidt-Rimpler, Snellen, Voelkers, and Wicherkiewicz, one cannot be greatly surprised by the pathetic confession of Hansen Grut, himself one of the greatest of the Old Guard of ophthalmology:—"*La déception que m'a causée le traitement des glaucomateux constitue un des plus grands chagrins de ma longue carrière ophtalmologique.*"

On the other hand, we find ranked among the champions of the method:—Derby, Haab, Hirschberg, Kuhnt, and Uhthoff. To reconcile the extraordinary discrepancy of statements seems impossible, but we can with profit consider some of the factors which make the case so difficult of decision. These will be taken in turn:

(1)—*The confusion as to what is to be included in the term glaucoma.*

As has already been pointed out, von Graefe ruled outside the pale of true glaucoma, all cases in which a distinct rise in tension could not be demonstrated to be present. His ideas were confessedly chaotic on this very important point. It was left to de Wecker to discover the path by which surgeons could escape from the enveloping darkness of the confusion which shrouded the subject. That he should have done so at a time when von Graefe's teaching to the contrary dominated men's minds, must redound to his everlasting credit. None yielded to him in admiration for his *grand* *maître*, but whilst his colleagues were urging that the simple forms are not true glaucoma, and should not therefore be treated by operative means, he struck out his own line and blazed the trail for all who came after to follow. His points may shortly be put as follows :

(a). Simple glaucoma frequently passes into the congestive form. This statement is not invalidated by the fact that the change often occurs late in the case.

(b). In the *same* patient we may meet with simple glaucoma on the one side and congestive glaucoma on the other.

(c). In the *same* family, especially among the Jews, one may find some members suffering from simple, and others from congestive glaucoma.

(d). The operation of sympathectomy (he might have added "or any other serious operation") will sometimes cause a simple chronic glaucoma to assume a congestive course.

(e). Indisputable cases are on record in which simple chronic glaucoma has been permanently cured by the operation of iridectomy.

The stand which de Wecker took seems the more remarkable when we consider not merely the attitude of his contemporaries, but that also of a large number of surgeons even at the present time. We will take these points *seriatim*.

During von Graefe's lifetime, a number of his pupils, struck by the difference between the results obtained by iridectomy in simple and in congestive cases, openly abandoned the method in the former, and drew down from their teacher a protest against discarding his operation when they had nothing better to offer in its stead. Eighteen years after his all too early death, his friend and colleague Snellen, in his capacity of opener of the glaucoma discussion at the Heidelberg Congress, rejected iridectomy, and yet no one protested. Later still, in the reports of the distinguished surgeons who placed their experience at de Wecker's disposal, we find abundant evidence of the same spirit at work. Some refused to acknowledge cases of simple glaucoma as such, confusing them with those of optic atrophy ; others drew a broad line of distinction between their results in cases in which congestive symptoms had from time to time made their appearance, and those in which the course had been simple throughout. Still others excluded from their statistics all purely simple cases, because they had definitely abandoned the idea of operative interference, unless some congestive manifestations were present. Running through a large number of the reports is the conviction that the prospect of good results from operation for glaucoma is in direct proportion to the evidence of increased tension present. Czermak crystallised this view in the statement that he never operated for glaucoma unless (1) the failure of vision had been accompanied by rhythmic evidences of ocular congestion, or (2) the patient assumed the whole responsibility for the results of the procedure.

A confusion in terminology is fatal to clear thinking or to the deduction of reliable inferences, and yet over this most important subject, we find such a source of error hanging like a heavy cloud, dimming the light, that might have been derived from excellent observations by ophthalmologists of the first class, and extinguishing all radiance from the recorded experience of many others of less distinction. To sum the matter up—(1) There has been a wide disagreement as to what cases should be included as true glaucoma and what should be excluded ; (2) of those who have kept the distinction sharp before their minds, some have operated for all conditions, whilst others have limited their active interference to selected cases ; and, finally (3) even the most logical thinkers have not always been careful to reflect clearly in their statistics the distinction which they have drawn in their own minds. It is not then to be wondered at that in this domain of science we still have to confess that "there, among the glooming alleys, progress halts on palsied feet."

It is not to be thought that the writer is venturing to criticise these men of the past, who crossed the mountain ranges of difficulty to plant the flag of science in territories of knowledge unexplored before their time. They struggled through the darkness of the encircling night to the dawning brightness of a day of knowledge. Our position is a different one. "Heirs of all the ages," we know what they guessed at; we can prove where they speculated; we begin far in advance of where they left off; and yet, there are many surgeons to-day who appear still to halt between two opinions, as to whether the "glaucomatous process" is one throughout the whole domain of the manifestations of a pathological increase of intra-ocular pressure, or is two or more fold. Be it clearly understood, we make no reference here to the hydra-headed ætiology of the condition, but confine ourselves sharply to a consideration of the process, *qua* process. To the writer's mind, it appears to be clearly established that there is no essential difference between the most chronic form of simple glaucoma and the most violent type of the hæmorrhagic affection. The question is one of the "quantity" and not of the "quality" of the elements which enter into the case. The subject has been fully dealt with on a previous occasion (*Ophthalmic Review*, Vol. XXXIV, 1915, p. 257) by the writer, and need not detain us further now.

(2).—*The period at which operative interference was undertaken varied enormously in different cases*, and was a primary factor in determining the success or failure of the means employed. We have already shown how strongly von Graefe felt on this subject, and how earnestly de Wecker endorsed his master's teaching that if operation was to be undertaken, the surgeon's watchword should be "the sooner the better." It matters not what form of the disease we have to do with. In one and in all alike the results obtained are commensurate with the promptitude with which we act. No one who has carefully read the opinions expressed by de Wecker's brilliant and talented contributors can have failed to recognise this conviction running through their writings. Like the dominant phrase in a piece of classical music, we find it continually repeated throughout the writings of most of those who have written on the subject. Some were content merely to express their convictions on the importance of early operating; others divided their cases into two groups, according to whether they had operated soon or late; whilst yet others had abandoned surgical interference, unless it could be made before the disease had had time to progress. Thus we see that the same want of uniformity of procedure, which we had cause to regret in our consideration of the previous section, is again to be found here, clouding the issues involved, and sensibly depreciating the value of the statistics delivered.

(3).—*The period during which the cases were followed after operation varied immensely.* There can be no question that this factor is one of very great importance, and much stress was laid upon it not only by von Graefe and de Wecker, but also by a large number of the latter's correspondents. So strong was the feeling on the subject that some of them, like Landolt, absolutely refused all statistics. Others, amongst whom may be numbered Fuchs, whilst clearly recognising that most iridectomised cases, if given sufficient time, ended in blindness, contended, and supported their contention by figures, that the operation, if it did not arrest the disease, at least delayed its progress, and so rendered valuable service to the patient.

The contention that in cases of simple glaucoma, the value of an operative method is only to be decided upon after watching the patient's progress for a period of many years, is up to a certain point a valid one, but it is essential to look at the question from every side before forming a definite judgment. To begin with, it is true that the course of some of these cases is extremely slow, and that most of them would not lead to blindness for a long time, even if unchecked. Moreover, they do not all progress at an even rate, nor is the course of any individual case undeviatingly uniform in the evolution of its signs and symptoms. To attribute a curative action to a method of operative interference may therefore be incorrect.

The next point to bear in mind is that, although the glaucomatous process may be definitely checked by an operative measure, the end the surgeon had in view may yet be defeated by a progressive atrophy of the optic nerve. The writer has put forward the view (THE OPHTHALMOSCOPE, January, 1916, p. 7) that in such cases the progressive atrophy may be really quite apart from any influence of the intra-ocular pressure, except in so far as that pressure has injured the nerve and so rendered it liable to fall a ready prey to any toxic or other influence, which under happier conditions, it would easily have overcome. The moral that we should in all such cases seek for and treat all possible causes of auto-infection, need not be laboured here. The suggestion, if confirmed by the experience of others, will help to explain the failure of operations, which so far as the reduction of tension is concerned, are technically successful.

Our third point is one which has been powerfully made by Fuchs, and to which not a few others have also called attention, *viz.*, that in view of the advanced age of many of our patients, it will often be sufficient for all practical purposes if we can delay the onrush of the disease, and so slow down its course that useful vision lasts the patient's term of life. This contention has often been made in favour of iridectomy, and up to a certain point its validity may be freely admitted. If, however, it can be shown that the modern operations give more lasting results than iridectomy, we shall be in a quite different position from that occupied by von Graefe, de Wecker, and their contemporaries, who, having nothing better to fall back upon, were bound to make the best they could of the means at their disposal.

We come now to a point of great importance, and one that, so far as the writer is aware, has never received proper attention, with the result that much unnecessary confusion has arisen. What has been written in the previous paragraphs refers to simple chronic glaucoma. It has little bearing on the prognostic significance of suitable operative interference in that chronic form of glaucoma, which is associated with intermittent, and often more or less rhythmic, exacerbations of intra-ocular pressure. It is necessary to make this point quite clear. The writer is convinced, and so he believes are most modern ophthalmologists, that there is a form of glaucoma, characterised by the manifestation of what may be termed the three cardinal signs of the disease, *viz.*, (1) cupping of the disc, (2) contraction of the field, and (3) (sooner or later) diminution of the visual acuity. These are the cases that von Graefe and many of the surgeons who succeeded him, excluded from the category of glaucoma. In dealing with them, we must bear in mind their slow rate of progress, and suspend our judgment as to the value of our therapeutic measures, but we must not allow their admitted existence to confuse other and more important issues. The whole tenor of the writings of our predecessors has been shown to be that iridectomy was most successful (1) when performed early in the case, and (2) when undertaken in the presence of marked, even if intermittent, exacerbations of tension. The writer is convinced that in such cases, the value of any method for the arrest of glaucoma can be estimated with considerable accuracy three months after the operation has been performed. If the tension of the eye is then found to be sensibly lowered, the surgeon may in most cases congratulate himself and his patient. It is, however, always necessary for him to bear in mind the danger which has already been alluded to, of what may be termed a collateral atrophy of the optic nerve.

(4).—*The technique of the operation has an undoubted influence on the results obtained.* The writer has little sympathy with the often used catch-word that "the worse the operation of iridectomy is performed, the better are the results." It appears to contain a grain of truth in a mass of error. What does seem of real importance is the exact *technique* employed. There would appear to be a wide-spread and very real misconception as to the method adopted by the older surgeons in the performance of an iridectomy. It has been stated by able and distinguished ophthalmologists that the "classical iridectomy for glaucoma" was made in the limbus and was of limited extent. Nothing could be more contrary to the facts of the case. von Graefe laid down (1) that the incision should be as eccentric as possible, in order to remove the iris as far as its ciliary attachment; he regarded this as essential to success; (2) that the excised piece of iris should be as large as possible —the more intense the symptoms the more extensive the incision; and (3) that the aqueous should be allowed to escape slowly. de Wecker's practice was the same, and a large number of his correspondents laid stress on these features of *technique*. They did not all do so, and there can be but little doubt that the procedure adopted varied considerably in different cases. Here we meet with another factor, which renders the statistics of various surgeons practically useless for comparative purposes. At the same time, it would be idle to contend that the modern method of performing an iridectomy is much more effective than the old. Such an assumption would be presumptuous to a degree. To understand the real importance of the subject, it is necessary to go back to the already quoted statement of von Graefe as to the frequency (in 20 per cent. of all cases) of filtration following the performance of an iridectomy. We have shown that he commented on, but failed to realise the significance of this form of scar, whilst de Wecker went straight to the heart of the matter. In order to obtain such a cicatrix, it is obviously essential that the wound should be a subconjunctival one. It is possible that many failed to realise this, and that their results were correspondingly disappointing.

It must be admitted that a study of the writings of the past masters of our craft does not make a strong case for the operation of iridectomy in the relief of glaucoma. We shall turn next to a consideration of what has been said or written on the same subject since the introduction of the modern filtering operations.

(*To be concluded.*)

A CYST OF THE PIGMENT EPITHELIUM OF THE IRIS, WITH REMARKS.*

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Introduction.

LITERATURE includes but a few scattered references to cases where a cyst is formed by the accumulation of fluid between the double layer of pigmented cells at the back of the iris, the so-called *pars retinalis iridis* or *pars iridica retinæ.* Indeed, such cases, observed clinically and confirmed pathologically, have been reported only by E. Treacher Collins[1] (1893) and by Eales and Sinclair[2] (1896).

In the following case a growth, believed to be a melanotic sarcoma of the iris, proved after removal of the eye, to be a cyst of the pigment epithelium of the iris.

Clinical Facts.

On July 6th, 1911, I was requested by Dr. C. H. Willey, of Sheffield, to see a lady, aged 43 years, whose history was as follows.—In December, 1910, she had occasion to consult Mr. George H. Pooley, of Sheffield, as she thought she required glasses. In the course of his examination, that gentleman appears to have found something amiss with the patient's right eye, in consequence of which he has seen her at intervals since the date mentioned. The growth, while under Mr. Pooley's observation, was thought to have become somewhat larger.

A couple of days before I saw Mrs. M——, the lady had consulted Mr. H. Secker Walker, of Leeds, who diagnosed a melano-sarcoma of the iris, and urged prompt removal of the affected eye.

There was no history of injury. Neither were there complaints of pain.

The patient, who looked in robust health, gave an account of two operations—the first, six years ago, for gall-stones, and the second, one year ago, for endometritis.

On examination of the right eye, tension was found to be normal, and sight, corrected with a suitable glass, was 6/5 (3 letters). No changes were to be seen with the naked eye beyond a group of slightly dilated vessels on the outer side of the eyeball, and a slight humping of the iris as regards its lower temporal quadrant. No changes could be made out in the tissue of the iris, and, in particular, there were no posterior synechiæ. Projecting from behind the pupillary edge of the lower temporal segment of the iris was a single, smooth, rounded mass of dark brown colour, perhaps best described as a finger-like projection. Its dimensions were noted as 3 mm. by 2 mm.—that is to say, about the size of a hemp seed. It was not notched, and was not in the least tremulous, and, in short, conveyed to my mind the impression of a solid growth. This supposition appeared to be confirmed by the results of transillumination. Thus, when the eye was illumined by the Leber instrument, the mass showed up as a dark projection against the bright glow obtained through the pupil. No shadow was obtained from the ciliary region with the transilluminator. The lens seemed to be slightly tilted upon its vertical axis. The fundus oculi was normal.

The left eye was healthy, both functionally and organically.

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*Presented to the Ophthalmological Society on May 5th, 1910.

A large pigmented nævus was found to occupy part of the right hypochondriac region of the patients' abdomen.

Treatment.

On July 7th, the affected eyeball was removed under chloroform.

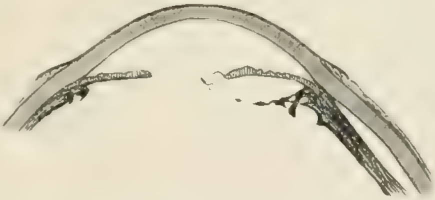
When a strong light—*e.g.*, the electric ophthalmoscopic lamp—was placed behind the enucleated eyeball, the pigmented mass appeared as a solid projection jutting into the illuminated pupil.

Pathological Anatomy.

The eyeball was placed in formol sodium chloride solution (10 per cent.), and at the end of twenty-four hours was frozen and bisected.

A series of antero-posterior sections passing through iris and neoplasm, when stained and examined with the microscope, showed the following points:

A congery of several small cysts, formed by separation of the uveal layers of the iris, lay near the root of the latter structure in the angle of the posterior chamber. A much larger cyst, of similar structure, was situated behind the iris, centrally, as it were, to those just mentioned. It lined the inner two-thirds of the iris, and extended for some considerable distance, as a rounded projection, beyond the edge of the iris into the pupillary area. No single section was happy enough to show the cyst in its entirety, since portions of its posterior wall were invariably missing. There was, however, no difficulty in mentally reconstructing the growth from an examination of several sections. Indeed, many individual sections were highly suggestive of its original structure, as outlined above, before it collapsed in the process of preparation for the microscope.



Like the smaller cysts, the larger one was formed by a separation of the uveal layers with fluid, and its interior showed no formed elements beyond numerous tiny particles of melanin derived presumably from its pigmented walls. In some of the sections the iris presented a slight forward bulge (seen clinically) corresponding to the cyst beneath, but it was not atrophic. For that matter the number of large, round, deeply pigmented cells (chromatophores) which lay in the stroma of the iris immediately in front of the anterior wall of the cyst appeared to show that the cells were in a state of proliferation, and the thickness of the cyst walls, too, seemed to point to the same conclusion. The remainder of the iris was of normal appearance, crypts, sphincter, and vessels with sheaths all being found in the specimens.

The crystalline lens was widely separated from the iris by the intervening cyst.

The angle of the anterior chamber was everywhere widely open.

Some of the sections showed an oval cyst arising from the anterior part of the ciliary body. It was formed by separation of the inner (non-pigmented) layer from the outer (pigmented) layer of the pars ciliaris retinæ. In other words, the former was bulged inwards, so as to form this delicate cyst. It may be noted, as a point of some slight interest, that in one specimen the cyst appeared to be bilocular. It contained particles of melanin, not in great number.

Numerous small cystic cavities, separated one from another by elongated and thickened Müllerian fibres, were present in the anterior segment of the retina near the ora serrata.

Remarks.

That the *pars iridica retinæ* may present various modifications and disorders is known to every student of ophthalmology. These may be grouped in the following way:

1. Nipple-like projections into the pupillary area from the pigment fringing the edge of the iris, the so-called ectropion uveæ.
2. Sheet-like projections which cover more or less of the anterior surface of the iris.
3. A cystic condition of the pigmented epithelium at the back of the iris, giving rise to such an appearance as is reported in the present communication.
4. Pigmented growths, malignant or innocent.

The third peculiarity presented by the *pars iridica retinæ* is assuredly the most interesting from the clinical point of view. It consists in a separation by fluid of the two pigmented layers at the back of the iris. The analogy to detachment of the retina from the choroid is obvious, and has been commented on by more than one writer.

These cysts have been found incidentally in the routine examination of pathological specimens by Collins, Schieck, Rabitsch, Oatman, and others. Indeed, the appearance is not uncommon in pathological specimens, especially in such as have been derived from cases of iritis (M. S. Mayou) or from young subjects (E. T. Collins). But records of such cases seen during life and verified after removal of the eye or iridectomy are extremely rare. For the first observation of this kind we are indebted to E. Treacher Collins.[1] The patient, a man of 64 years, suffered from an almost mature cataract, and presented, besides, a deep-brown mobile mass lying behind the lower part of the iris. The swelling had a sharply-defined curved margin, with a slight notch in its centre. In order to determine the nature of the growth, incision and iridectomy were made downwards, and on seizing iris and dark mass with forceps, the latter collapsed. "Examination of the piece of iris removed," wrote Collins, "showed that the dark mass was evidently of a cystic nature." In commenting upon the foregoing case, Collins remarked, "that the separation of the two layers (of the uveal pigment) should become so extensive as to give rise to the appearance of a tumour has not, I think, before been suggested."

It was not long before Collins' suggestion was confirmed by Eales and Sinclair,[2] who published a most conclusive clinical and pathological account of pigmentary cyst of the iris, which they had found in the left eye of a man, aged 47 years. The eye, which could not tell day from night, was in a state of absolute glaucoma. Two dark-brown globular masses, lying close together, were seen to extend into the pupillary area from behind the upper and outer part of the iris. The masses oscillated freely with every movement of the eye, which also produced a fine jelly-like trembling of the surface of the protusions, only to be appreciated on close examination with focal illumination and the help of a magnifying glass. The eye was excised. The specimen was examined by C. Devereux Marshall, who, in addition to evidences of secondary glaucoma, found at the pupillary edge on one side "a large cyst formed by splitting and distention of the pigment layer."

The above, then, are the only two cases known to me where the diagnosis, made or suspected during life, was confirmed by examination of the eyeball after removal.

Literature, however, contains several reports of cases almost certainly belonging to the same category. For example, M. W. Zimmerman's case[3] of bilateral symmetrical pigmented tumour extending into each pupil from behind the iris is well known and often quoted. During the four years the patient remained under observation, there was distinct though slight increase in the size of one tumour, but little, if any, in the other. The case was regarded by Zimmerman as one of uveal cyst, probably arising, he thought, from the anterior border of the uveal body. Again, M. S. Mayou[4] reported a cyst of the pigment epithelium of the iris which he found accidentally, so to speak, when dilating the pupils of a man, aged 67 years, for the purpose of estimating refraction. Another case was reported a couple of years later by R. E. Bickerton and Ernest Clarke[5] in a female, aged 36 years, whose right eye was painful and of full tension. V. was 6/24. A pigmented swelling lay behind the lower-outer quadrant of the iris. In this case there was evidently a doubt in the minds of the authors as between a cyst of the iris and a sarcoma of the ciliary body.

The following case, which has been under my observation for several years, is probably an instance of retro-iridic cyst of the kind discussed.—A medical man, aged 44 years, consulted me on December 2nd, 1909, because he had experienced some slight pain in his right eye for several months. R.V.=6/24 (two letters). L.V.=6/9 (ptly.). With ametropia corrected, the V. of each eye could be brought to 6/6 (almost). There were several pigment spots on both irises, and moles were present about the body and extremities. When the left pupil was fully dilated with a mydriatic, a smooth roll, as it were, of rich brownish pigment was seen to lie between the iris and the lens capsule on the outer side of the left eye. It was non-tremulous, and was evidently connected with the uveal pigment of the posterior surface of the iris. It might be described as arranged so as to form a chord to the arc of the lower-outer segment of the pupil.

The question of diagnosis is brought into unfortunate prominence by the present case, where, as already said, a uveal pigment cyst was mistaken for a melano-sarcoma, with the result that the eye was sacrificed, despite the fact that it retained excellent vision. The circumstance, however, is not unique, for literature contains at least three instances of a similar event recorded respectively by F. Schieck (1904), H. Wintersteiner (1906), and A. H. Pagenstecher (1910).

The facts of Schieck's[6] case are briefly as follows.—The patient, a maid, aged 22 years, consulted Schieck for cataract in the right eye, and another ophthalmic surgeon, who had examined the girl several months previously, had diagnosed an intra-ocular neoplasm. Apart from the cataract, there was a circumscribed protusion of the lower and inner part of the right iris. V.=fingers at half a metre. The cataract was removed by the combined operation. Three large brownish nodules were then seen to be situated, close to one another, between the iris and the lental remains, thus accounting for the bulging of the iris noticed before removal of the cataract. A diagnosis was made of melano-sarcoma of the iris and ciliary body, and accordingly the eye was enucleated ten days after extraction of the cataract. On microscopical examination, three pigment cysts were found arising from the posterior surface of iris and ciliary body.

Winstersteiner's case[7] occurred in a man, aged 28 years, who had suffered from several slight and transient attacks of glaucoma in his right eye, as shown by foggy vision, haloes, and pain. On examination, the pupil was found to be round and to react well to light. The anterior chamber was much shallowed as regards its lower and outer part by bulging of the iris, particularly towards the periphery. After the pupil had been dilated by homatropine, a smooth-edged tumour, originating from the anterior part of the ciliary body or the posterior surface of the iris, was observed to lie behind the lower and outer part of the iris. It had a velvety-brown appearance, and was non-translucent when examined by focal illumination with an electric lamp. The lens was slightly displaced by the growth, which was diagnosed as a melano-sarcoma of the ciliary processes or of the iris. V. = 5/4. Some increase in the size of the neoplasm took place in the interval between two successive examinations, which amounted to seven days only. The eyeball was enucleated, but, to Wintersteiner's surprise, on section no tumour could be seen. On microscopical examination, however, there were multiple cysts of the iris and of the most anterior part of the uvea. Other small cysts were present in various parts of the *pars iridica retinæ*.

The third case was reported recently by Adolf H. Pagenstecher[8] in a male patient, aged about 60 years. The main facts follow—The right eye presented an opacity in the lower-outer part of the crystalline lens, whereby sight was reduced to 6/36 or 6/24. A brownish-black tumour projected from behind the lower-outer part of the iris for about 1 mm. into the pupillary area, and extended for 2 mm. to 3 mm. along the adjacent edge of the iris. The last-named structure was bulged forward over the site of the underlying growth, so as to render the anterior chamber shallow in the corresponding position. There was no inflammation, and tension was normal; but the eye was painful when the patient read. Transillumination was not tried. The patient was seen by van Duyse, of Ghent, who diagnosed a malignant growth from the hinder surface of the iris, and advised immediate enucleation of the eye, an operation carried out by Pagenstecher. No teleplasm, however, was to be seen when the eye was opened. Microscopical preparations showed multiple cysts of the posterior surface of the iris and ciliary body. One of the iris cysts, formed by separation of the two layers of the uvea, was the cause of the appearances seen before operation.

Finally, under the suggestive title of "Phantom Intra-ocular Tumour," Arnold Knapp[9] has described a case in which clinically the diagnosis of sarcoma of the ciliary body was made, but when the eyeball was opened, immediately after it had been enucleated, no such tumour was found. Microscopical examination, however, showed in addition to pronounced cystic degeneration of the retina, large cysts containing mucin of the non-pigmented cells of the pars ciliaris retinæ, and, in some sections, a detachment of the two layers of that structure. The tumour seen clinically, then, appeared to be such a large cyst, which had ruptured when the globe was opened.

The truth is that the diagnosis of retro-iridic cyst may be simple or exactly the reverse. Points in favour of a cyst as opposed to a solid growth would be bilaterality,* multiplicity, mobility, tremulousness, notching of the visible portion of the growth, and, above all, translucency of the mass. It is a somewhat sorry reflection, nevertheless, that in my own case the very sign that should possess the greatest importance in the differential diagnosis was my undoing. For when the Leber transilluminator was applied to the sclera, the pupillary mass appeared to be altogether opaque. It was this, more than any other point, that led me to surmise that I had to deal with a solid growth, which from its history, position, and colour could hardly be other than a melano-sarcoma. A similar finding led Wintersteiner to mistake a pigment cyst for a melanotic sarcoma, and to remove the affected eye, although in his case, so certain did he feel of the diagnosis on other grounds, that he did not employ the transilluminator.

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* [illegible]

The association of a retro-iridic tumour with a sheet-like extension of pigment covering, more or less, of the anterior surface of the iris, as in the case by Eales and Sinclair, would be suggestive of the uveal origin of the growth, although not of its cystic nature. A uveal cyst has been known to increase in size in the short space of seven days (Wintersteiner), while every ophthalmic surgeon is familiar with the tardy growth of an intra-ocular sarcoma, so long as it is confined to the eyeball. Hence, it would be unsafe to attach undue importance, from the diagnostic point of view, to increase in size of the tumour while the patient remained under observation.

To the humping of the iris and the slight displacement of the lens observed in my patient, I was inclined to attach less importance, since I knew that similar features had been present in the cases of Zimmerman, Wintersteiner, and some other surgeons.

It has been proposed to employ puncture for purposes of diagnosis. The suggestion has been carried into effect by E. Fuchs[11] with happy results. When the swelling in his case was pierced by a needle, it collapsed, and remained much smaller than before. Its cystic nature, however, had previously been rendered certain by means of transillumination. As an instructive contrast to this may perhaps be placed a case reported not long ago by F. A. Juler,[12] where a growth, which there were some grounds for thinking might be a pigment cyst, was punctured, with the result that the anterior chamber at once filled with blood. A previous puncture had led to no modification in the appearance of the tumour, which when examined pathologically, was found to be a sarcoma of the ciliary body and iris. For my own part, I cannot now help thinking that exploratory puncture (a harmless enough proceeding) should be practised in every doubtful case.

With regard to the pathogeny of the cysts, we must distinguish such as are primary and idiopathic from those which are secondary and symptomatic. As to the former, several authors, in particular W. Gilbert,[13] have dwelt upon the possibility of a congenital origin. They draw attention to the fact that during embryonic life, the two layers of the uvea are distinct structures, and suggest that owing to this or that cause, subsequent union between them may not be complete everywhere. In this way they would explain the production of a cyst or cysts. In this connection, the fact may be recalled that up to the end of the seventh month of fœtal life, a space is constantly present at the junction of the anterior end of the two layers of the secondary optic vesicle, the so-called "ring sinus" of A. von Szily. Wintersteiner, it may be added, regarded the multiplicity of the cysts present in his case as an argument in favour of the embryolgical origin of the condition.

As to secondary cysts of the uveal pigment, they have been known to follow operation on the eye (W. Gilbert), and to be associated with glaucoma or with tumours of the ciliary body (E. Treacher Collins) or of the iris (W. Gilbert), and it seems likely that they are commoner sequels of iridocyclitis, especially when traumatic, than is generally supposed. Finally, numerous small cysts have often been observed in cases of diabetes, as pointed out by Kamocki[14] and some other writers.

The prognosis of uveal cysts, if not interfered with surgically, does not appear to differ from that of any other intra-ocular growth, whether solid or fluid. They lead sooner or later to opacity of the lens (localised or generalised), secondary glaucoma, and to loss of sight, as happened in the cases reported, among others, by Collins[1], Eales and Sinclair[2], and Asayama. As a rare event, they may be ruptured by an accidental blow upon the eye and cause no more trouble, as appears to have happened in a case, the facts of which were related to me by Sir John Tweedy.

The treatment of the uveal cyst opens up large and interesting questions. Puncture, repeated if necessary, has been proposed, and in suitable cases, might doubtless be carried out. But, as Wintersteiner has insisted, that operation could furnish no guarantee against the cyst refilling. Again, there is the further point, namely, that the cysts are seldom single, so that puncture, although it may succeed in evacuating the contents of one cyst, cannot assure us against subsequent trouble from the enlargement of a second cyst. An iridectomy, such as was practised in Collins' case, where the lens was opaque, lies open to the same objection, although not, of course, to the same extent. In brief, it seems tolerably safe to assume that enucleation will be the ultimate fate of many of the eyeballs affected with uveal cyst, a view that has already been voiced by Wintersteiner.

REFERENCES.

1. **Collins, E. Treacher.**—*Royal London Ophthalmic Hospital Reports*, Vol. XIII, Part i, p. 58, 1893.
2. **Eales and Sinclair.**—*Trans. Ophthal. Society U.K.*, Vol. XVI, 1896, p. 56.
3. **Zimmerman, M. W.** *Annals of Ophthalmology*, July, 1897.
4. **Mayou, M. S.**—*Trans. Ophthal. Society U.K.*, Vol. XXV, 1905, p. 86.
5. **Bickerton, R. E. and Clarke, Ernest.**—*Trans. Ophthal. Society U.K.*, Vol. XXVII, 1907, p. 83.
6. **Schieck, F.**—*Klin. Monatsbl. f. Augenheilkunde*, 1904, XLII, p. 341.
7. **Wintersteiner, H.**—*Bericht über die Dreiunddreissigste Versammlung der Ophthalmologischen Gesellschaft*, Heidelberg, 1906, p. 345.
8. **Pagenstecher, A. H.**—v. Graefe's *Archiv f. Ophth.*, Vol. LXXIV, 1910, p. 290.
9. **Knapp, Arnold.**—*Trans. American Ophthalmological Society*, Vol. XII, Part iii, 1911, p. 883.
10. **Carter, R. Brudenell.**—*Trans. Clinical Society*, Vol. VII, p. 60, 1874.
11. **Fuchs, E.**—*Trans. American Ophthalmological Society*, Vol. XII, Part iii, 1911, p. 884.
12. **Juler, F. A.**—*Trans. Ophthal. Society U.K.*, Vol. XXXI, 1911, pp. 44 and 131.
13. **Gilbert, W.**—*Klin. Monatsbl. f. Augenheilkunde*, 1910, Vol. XLVIII, p. 149.
14. **Kamocki.**—*Arch. f. Augenheilkunde*, 1887.

A CLINICAL STUDY OF FIFTY-FIVE CASES OF INTRA-OCULAR RETENTION OF FOREIGN BODIES, WITH RESULTS TWO YEARS AFTERWARDS.

(*Concluded from p. 477.*)

BY

W. BARRIE BROWNLIE, M.D., GLASG., F.R.C.S., EDIN.,

ASSISTANT OPHTHALMIC SURGEON,

[illegible] LANCASHIRE ROYAL INFIRMARY,

[illegible], ENGLAND.

I. Number of case ... 49

II. Eye affected ... ... Right.

III. Position and character of the wound Small [illegible]
White streak of Descemet's membrane well seen, although corneal wound now healed

IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Hole (?) of iris behind wound. Lens opaque. Iris muddy. Good deal of ciliary injection. Pupil fixed.
V. Visual acuity of injured and uninjured eye	Right : counts fingers. Left : $\frac{6}{12}$.
VI. Time intervening between date of injury and patient first presenting himself	A week.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous—anterior part.
IX. Magnet and other operations, and consequent complications	Electro-magnet. Corneal section (because foreign body well forward, otherwise a posterior sclerotomy would have been done, owing to anterior uveitis) after drawing foreign body into anterior chamber. Extraction of small scale (3 mm. × 2 mm.). 22 days later, soft lens matter drawn off. Good deal of pupillary exudate and lens matter occluding pupil. Needled 9 months after injury.
X. Results two years afterwards	Right : hand movements. Left : $\frac{6}{12}$. No complaint. Saved.

I. Number of case	50.
II. Eye affected	Left.
III. Position and character of the wound	Scleral wound (5 mm.) Temporal side.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Tension —. Loss of vitreous.
V. Visual acuity of injured and uninjured eye	Left : hand movements. Right : $\frac{6}{18}$: Hypermetropic astig.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Large scale (12 mm. × 5 mm.) extracted through original wound (metal too large to be drawn into anterior chamber), which was enlarged. Considerable hæmorrhage. Enucleation 9 days later. Soft eye with vitreous exudate.
X. Results two years afterwards	Right : $\frac{6}{18}$. No complaint. Lost.

I. Number of case	51.
II. Eye affected	Right.
III. Position and character of the wound	Penetrating equatorial scleral wound—temporal side.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Tension —2. Loss of vitreous.
V. Visual acuity of injured and uninjured eye	Right : $\frac{6}{60}$. Left : $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.

VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Vitreous—posterior part.
IX. Magnet and other operations, and subsequent complications	Electro-magnet. Large scale (5 mm. × 4 mm.) extracted through original wound. It "locked," and was extracted with difficulty. Detached retina below and to outer side a month after extraction of metal.
X. Results two years afterwards	Right : counts fingers at 18 inches. (Detachment of retina). Left : $\frac{6}{6}$. No complaint. Examined 6 months after after date of injury. Saved.

I. Number of case	52.
II. Eye affected	Right.
III. Position and character of the wound	Punctured wound upper and inner quadrant of cornea.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Foreign body sticking in iris behind wound. Anterior chamber full.
V. Visual acuity of injured and uninjured eye	Right : [illegible]. Left : $\frac{6}{9}$.
VI. Time intervening between date of injury and patient first presenting himself	1 day.
VII. X-ray plate	Positive.
VIII. Position of foreign body ...	Iris.
IX. Magnet and other operations, and subsequent complications	Keratomy and extraction of metal with weak current and small magnet. Spicule 2 mm. × ½ mm.
X. Results two years afterwards	Right and left : $\frac{6}{6}$. Examined 6 months after date of injury. Saved.

I. Number of case	53.
II. Eye affected	Right.
III. Position and character of the wound	Small linear wound (2 mm.) upper and outer quadrant of cornea.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Foreign body in iris behind wound. Anterior chamber empty.
V. Visual acuity of injured and uninjured eye	Right : [illegible] Left : [illegible]
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate... ...	Positive.
VIII. Position of foreign body ...	Iris
IX. Magnet and other operations, and subsequent complications	Extraction of metal (2 mm. × 1 mm.) through original wound by insertion of magnet point.
X. Results two years afterwards	Right and left : [illegible]. No complaint. Examined [illegible] months after date of injury. Saved

I. Number of case ...	[illegible]
II. Eye affected	Right.
III. Position and character of the wound	[illegible]

IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Punctured wound of lid in front of wound. Tension —. Choroid pouting from edges of wound. Intense chemosis of conjunctiva. Threatening panophthalmitis. Iris muddy and streak of pus over it.
V. Visual acuity of injured and uninjured eye	Right: hand movements. Left: $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	2 days.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Well behind eyeball, outer side of orbit.
IX. Magnet and other operations, and subsequent complications	Owing to threatening panophthalmitis, enucleation done straight away. Point of exit of metal at posterior part of globe to outer side of macula
X. Result two years afterwards	Left: $\frac{6}{6}$. No complaint. Examined 3 months after date of injury. Lost.

I. Number of case	55.
II. Eye affected	Right.
III. Position and character of the wound	Very small punctured wound of sclera at inner side.
IV. Other complications and special points on naked eye and ophthalmoscopic diagnosis	Vitreous hazy and containing much blood-clot. Apparently a detachment of retina to inner side. Defect of visual field at this part. Air bubbles in vitreous.
V. Visual acuity of injured and uninjured eye	Right: $\frac{6}{60}$. Left: $\frac{6}{6}$.
VI. Time intervening between date of injury and patient first presenting himself	Same day.
VII. X-ray plate...	Positive.
VIII. Position of foreign body ...	Behind eyeball
IX. Magnet and other operations, and subsequent complications	Electro-magnet. No result except dull pain. After vitreous cleared, the detachment of retina under site of entrance wound was confirmed and point of exit through back of eye identified as a black spot to outer side of disc near macula. A fortnight after the injury, the retina became reattached, the eye remaining quiet, and vision improved to $\frac{6}{9}$.
X. Results two years afterwards	Right: $\frac{6}{9}$. Left: $\frac{6}{6}$. No complaint. Curious marked pigmentary disturbance round macula where the exit wound is now identified by a large mass of pigment. Examined 2 months after date of injury. Saved.

Analysis of the Cases.

The following points are brought out by analysis of these cases:

(1) Twenty-eight eyes were saved, twenty-seven eyes were lost, *i.e.*, 50·91 per cent. and 49·09 per cent. respectively.

(2) Visual acuity of the eyes saved; 16 had useful vision, in 13 the vision ranged from 6/6 to 6/24, in 3 the vision ranged from 6/36 to 6/60, in 3 the vision ranged from 4/60 to 2/60, and in 9 the vision ranged from the counting of fingers to perception of light.

[illegible]	[illegible]	[illegible]	Visual acuity	Position of wound and damage	Operation.	Result, with visual acuity	Date when last seen.
1	[illegible]	Right ...	Shadows	Large. Cornea and ciliary region. Prolapse of iris. Lens cataractous	Excision of prolapsed iris	Enucleated. Quiet ...	26/2/12
[illegible]	[illegible]	Right ..	Shadows	Large. Cornea and ciliary region. Prolapse of iris and vitreous. Lens cataractous	Excision of prolapsed iris, and later, soft lens matter drawn off	Enucleated. Quiet ...	29/2/12
[illegible]	[illegible]	Right ...	[illegible] ...	Cornea and ciliary region	Wound covered by conjunctiva ...	6/12. Quiet	6/1/12
4	[illegible]	Right ...	6/60 ...	Large corneal. Prolapse of iris ...	Excision of prolapsed iris. Covered by conjunctiva	6/18. Quiet	1/2/12
[illegible]	[illegible]	Right ..	6/60	Cornea and ciliary region. Prolapse of iris	Excision of prolapsed iris, and conjunctiva sutured	Few cataract streaks behind wound. 6/24. Quiet	21/2/12
6	18/11/11	Left ..	6/36 ...	Sclera and ciliary region. Prolapse of vitreous	Conjunctiva sutured over wound	6/9. Quiet	2/2/12
7	[illegible]	Left ..	6/36	Sclera. Prolapse of vitreous ...	Conjunctiva sutured over wound	6/5. Quiet	12/1/12
8	16/11/11	Right ..	Fingers ...	Cornea. Lens cataractous ...	Soft lens drawn off (24/11/11) ...	Quiet. Visual acuity right = fingers + 12 D sph + 2 D cyl = 6/18	7/3/12
9	[illegible]	Left ..	6/60 ...	Prolapse of iris. Limbus and ciliary region	Prolapsed iris excised. Conjunctiva sutured	6/9. Quiet	25/1/12
10	[illegible]	Right ..	6/60 ...	Prolapse of iris. Cornea and limbus	Prolapse excised. Conjunctiva sutured	6/18. Quiet	29/1/12
11	18/10/11	Right ..	Shadows...	Cornea. Hyphæma. Prolapse of iris	Panophthalmitis (19/10/11)... ...	Enucleated. Left, quiet	21/2/12
12	4/10/11	Left ..	6/60 ..	Cornea. Prolapse of iris	Replaced iris. Conjunctiva sutured	Left, 6/18. Quiet ...	11/11/11
13	[illegible]	Left ...	6/18 ...	Cornea. Anterior chamber empty		6/12. Quiet	16/3/12
14	[illegible] Accident 3	Right .. days ago	Perception of light	Cornea. Iris adherent to wound. Lens cataractous	Iris snipped. Soft lens drawn off	Quiet. Black pupil. +10 D sph. 6/36	15/3/12

15.	9/2/12	Left ...	3/60 ...	Cornea. Prolapse of iris. Vitreous Lens cataractous	Excision of prolapsed iris	6/12. Quiet	15/3/12
16.	30/1/12	Right ...	6/18 ...	Limbus. Prolapse of iris	Excision of prolapsed iris Conjunctiva sutured	6/18. Quiet	15/3/12
17.	29/1/12	Left ...	Perception of light	Cornea. Prolapse of iris Lens cataractous	Excision of prolapsed iris	Lens cataract stationary. Perception of light	14/3/12
18.	27/1/12	Left ...	6/18 ...	Cornea. Iris adherent	Iris freed	6/12 Quiet	21/2/12
19.	25/1/12	Left ...	Perception of light	Cornea Prolapse of iris. Lens cataractous	Enucleated	Right. Quiet	11/3/12
20.	30/12/11	Right ...	Perception of light	Cornea and limbus	Enucleated	Left. Quiet	1/3/12
21.	2/1/12	Right ...	Hand movements	Cornea. Prolapse of iris Lens cataractous	Iris replaced Lens cataract drawn off	+10 D sph. 6/36. Quiet	15/3/12
22.	2/12/11	Right ...	6/20 ...	Cornea Iris prolapsed Lens cataractous	Excision of prolapsed iris	Cataract progressed but slowly	8/3/12
23.	14/12/11	Right ...	6/18 ...	Iris engaged in wound	Replaced	6/18. Quiet	15/3/12
24.	27/2/12 2 days ago	Left ...	6/24 ...	Cornea Iris adherent and hypopyon	Enucleated	Right Quiet	18/3/12
25.	1/3/12	Left ...	6/60 ...	Corneal wound Engaged iris a week ago	Cautery	6/24. Quiet	15/3/12
26.	27/2/12 7 days ago	Left ...	Perception of light	Cornea Prolapse of iris Lens cataractous	Prolapsed iris excised Cautery ...	Fingers. Quiet ...	12/3/12
27.	27/2/12	Left ...	6/18 ...	Cornea (small) Opacity in lens ...	Nil	6/18. Quiet	15/3/12
28.	11/3/12	Left ...	6/9 ...	Ciliary region Vitreous prolapse	Conjunctiva sutured	6/9. Quiet	20/4/12
29	9/2/12	Right ...	Fingers ...	Cornea Blood in vitreous Adherent iris. Lens cataractous	Lens cataractous, drawn off. Iris freed	6/24. Iris adherent. Quiet	1/3/12
30.	27/2/12 2 days ago	Left ...	Hand movements	Ragged wound of ciliary region. Lens cataractous. Prolapse of iris	Prolapse excised. Conjunctiva sutured	Iridocyclitis Enucleated	15/3/12

(3) Of the eyes lost, 8 were enucleated on admission as hopelessly disorganised eyeballs, or within three days, when signs of commencing panophthalmitis presented, 1 went on to panophthalmitis, 12 were enucleated within three weeks of the injury on account of plastic irido-cyclitis, 6 were enucleated after dismissal as atrophic, sightless eyeballs, with ciliary tenderness.

(4) Two cases of sympathetic disease occurred. One was of the milder type, optic neuritic in character, and did well, with a resultant visual acuity of 6/6; the other, a severe case of the plastic irido-cyclitic type, ended in almost total visual destruction of the eye, the resultant visual acuity being perception of light.

(5) The results according to the position of the wound and of the metal. I have already referred to this under the heading of "Prognosis."

(6) The X-ray plate was doubtful in case 28, and negative in cases 11 and 22. No plate was taken in cases 9 and 10. With these exceptions, the X-ray plate was positive.

For comparison I have tabulated (pp. 528 and 529) a second list of 30 cases of penetrating injuries to the eye by metal, but where the metal was not retained in the eye; the X-ray plate and magnet operation being negative in each case.

The following are the points to be noticed:—

(1) Twenty-three eyes were saved and only seven eyes were lost, equalling 77 per cent. and 23 per cent. respectively.

(2) Of the eyes saved, twenty had a vision of from 6/6 to 6/60, and three from 1/60 to perception of light.

(3) No case of sympathetic disease occurred.

A comparison of this list with the first shows that, irrespective of the size and position of the wound, the prognosis is infinitely better both as regards the saving of the eye, the resultant vision, and the risk of sympathetic, provided that asepsis is carefully observed, and the wounds are covered by conjunctiva.

Conclusions.

The points that I would specially draw attention to are as follow:

(1) *The urgent necessity of measures being universally adopted to prevent, or at least to minimise, the risk of these injuries occurring at all.*—

A perusal of my own cases, and of the various journals of ophthalmology, where results of magnet operations appear from time to time, will show that the results are bad, both as regards the saving of the eye, and the vision if the eye has not been enucleated. It was thought that the introduction of the giant magnet would remedy these matters somewhat. That it does so as regards rendering the removal of pieces of metal from the posterior part of the eye easier, there is no doubt; but the slow iridocyclitis, which so frequently follows extraction of the metal, either necessitates enucleation of the eye subsequently, or seriously affects the visual power of the eye, with the risk of sympathetic ophthalmitis, if it has been decided that the eye should be retained, One could quote many authorities to emphasise this point, but two only need be mentioned. For example, Rollet[29]: of 18 cases, only 5 had useful vision left; and Wharton[30]: of 55 cases, 33 eyes were saved, and of these 21 had useful vision. The former results are rather bad, and the latter, although somewhat better, are far from ideal.

For these reasons, then, I think that workmen, employed in an occupation where the risk of being struck with a chip of metal is possible, should wear some protection in the shape of thick plane glasses to divert the path of a flying splinter. Horn spectacles, I am afraid, would rather interfere with their work. Provided the glasses were sufficiently thick and compatible with the carrying out of their work satisfactorily, I do not think there is much risk of the glasses breaking and injuring the eyes – rather a rare injury, as has been pointed out by Lauber[31], who quotes Hirschberg as mentioning a case in which a chip of metal, weighing 6020 milligrammes, had shattered the glasses, but left the eyeball intact.

I am aware that protective measures of this sort are adopted in many workshops, but the system should be enforced in every industry of the kind.

(2) *The great importance of early diagnosis of a foreign body in the eye.*—

Provided that the matter be gone about in the methodical way I have described, the presence of a chip of metal in the interior of the eyeball can be recognised within half-an-hour's examination at the most, in the great majority of cases, in a well-equipped hospital, and its removal carried out immediately, thus lessening somewhat the possibility of future complications.

(3) The necessity of giving *a guarded prognosis*, especially in those cases where the metal is posterior to the lens, as regards the possibility of subsequent enucleation, serious defect of the vision of the eye, and the possibility of sympathetic ophthalmitis.

(4) With regard to *sympathetic ophthalmia*, in addition to the usual signs mentioned in text books:

(a) The importance of a differential blood count being taken at periodical intervals after the metal has been extracted until the eye has completely recovered.

(b) The importance of having an eye from which a piece of metal has been extracted, and which subsequently has developed a plastic iridocyclitis necessitating enucleation, examined by a competent pathologist, to find out if there are any evidences of the "typical infiltration of Fuchs."

(c) When the patient at any future date makes a complaint of the uninjured eye, again the importance of a differential blood count, and of a reference being made to the pathological condition of the injured eye, if such has been enucleated.

(d) In view of the recently published results of treatment by these drugs, the importance of salicylates and of salvarsan in the treatment of sympathetic ophthalmia, in addition to the usual local measures.

REFERENCES.

1. **Rogers, W. K.**—*Ophthalmology*, January, 1913.
2. **Berry, George A.**—"Diseases of the Eye." Second edition, 1893, p. 335.
3. **Berry, George A.**—*Ibidem*, p. 334.
4. **Boxer, E.**—The Ophthalmoscope, Vol. IX, 1911, p. 562.
5. **Ramsay, A. Maitland.**—"Eye Injuries and their Treatment," 1907, plates XVIII and XIX.
6. **Ramsay, A. Maitland.**—*Ibidem*, pp. 78 and 80.
7. **Ramsay, A. Maitland.**—*Ibidem*, plate XVII.
7A. **Butler, T. H.**—The Ophthalmoscope, Vol. VII, 1909, p. 325.
8. **Rollet, E.**—*Archives d'Ophtalmologie*, juin, 1912.
8A. **Maddox, E. E.**—*British Medical Journal*, November 1st, 1913, p. 1,156.
9. **Lamb, F. W.**—*Ophthalmology*, July, 1912.
10. **Hirschberg, J.**—*Centralbl. f. prak. Augenheilkunde*, July, 1909.
11. **Haab, O.**—*Archiv f. Augenheilkunde*, 1910.
12. **Ramsay, A. Maitland.**—"Eye Injuries and their Treatment," 1907, p. 73.
13. **Hepburn, M. L.**—*British Medical Journal*, November 1st, 1913, p. 1,153.
14. **Werner, L.**—"Swanzy's Handbook of the Diseases of the Eye and their Treatment," Eleventh edition, 1915, p. 195.
15. **Ramsay, A. Maitland.**—"Eye Injuries and their Treatment," 1907, p. 106
16. **Rowan, J. and Sutherland, A. W. M.**—The Ophthalmoscope, Vol. VIII, 1910, p. 8.
17. **Gradle.**—The Ophthalmoscope, Vol. VIII, 1910.
18. **Browning, S. H.**—*British Medical Journal*, November 1st, 1913, p. 1,155.
19. **Coats, G.**—*British Medical Journal*, October 19th, 1912.

20. **Fuchs, E.**—"Text-book of Ophthalmology," Fourth edition, 1911, p. 404.
21. **Browning, S. H.**—*British Medical Journal*, November 1st, 1913, p. 1155.
22. **Fuchs, E.**—"Text-book of Ophthalmology," Fourth edition, 1911, p. 404.
23. **Coats, G.**—*British Medical Journal*, October 10th, 1912.
24. **Gifford, H.**—THE OPHTHALMOSCOPE, Vol. VIII, 1910, p. 257.
25. **Wharton, J.**—THE OPHTHALMOSCOPE, Vol. VII, 1909, p. 310.
26. **Rollet, E.**—*Revue Général d'Ophtalmologie*, 31 octobre, 1910.
27. **Goulden, C.**—*Royal London Ophthalmic Hospital Reports*, Vol. XVII, Part ii, January, 1908, p. 301.
28. **Werner, L.**—"Swanzy's Handbook of the Diseases of the Eye and their Treatment," Eleventh edition, 1915, p. 202.
29. **Rollet, E.**—*Archives d'Ophtalmologie*, juin, 1912.
30. **Wharton, J.**—THE OPHTHALMOSCOPE, Vol. VII., 1909, p. 310
31. **Lauber, H.**—THE OPHTHALMOSCOPE, Vol. XII, 1914, p. 201.

THE END.

CLINICAL MEMORANDA.

PIGMENTATION IN THE LENS.*

BY

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A. P., male, aged 29 years, instrument maker. The patient came to the Central London Ophthalmic Hospital on March 18th, 1916, with a history of failing vision in his right eye for six months. On various occasions he has had several foreign bodies in the eye, as he works with the lathe. These have been removed; the last one being on March 12th, 1915, which was removed from the cornea at the Hospital.

On examination, the vision was less than 6/60, and when the pupil was dilated, there were opacities in the anterior capsule of the lens and also in the deeper portions of the lens, with several red spots almost the colour of rust. The case was X-rayed on two occasions (good photographs being obtained), but no foreign bodies could be found in the eye.

The appearance is suggestive that a tiny piece of steel may have at some time entered the lens, although no entrance wound can be found. The red spots are probably of oxide of iron.

THE OPHTHALMOSCOPE IN GYNÆCOLOGY AND OTOLOGY.†

BY

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I HAVE been tempted to introduce these very brief remarks at this Congress for these reasons:—

Fifty years' experience in general medicine and surgery, and in the use of the ophthalmoscope, have convinced me that few means of diagnosis are so widely neglected as ophthalmoscopic examination.

---

[*] [illegible] May 5th, 1916.

[†] [illegible] Oxford Ophthalmological Congress, [illegible] 1916.

This conclusion has been the more forcibly brought home to me by reason of special work done in ophthalmology, otology, and gynæcology.

Forty-eight years have elapsed since I opened the Cork Eye, Ear, and Throat Hospital; forty-four since I started the Cork Maternity; and forty-two since, with other friends, I was mainly instrumental in placing the Hospital for Women and Children on a sure foundation.

Perchance the mention of these facts may add some additional force to the few observations I intend to make.

Many years since, in the earlier editions of my work on "Diseases of Women," I wrote:—"It is not too much to say that every educated physician and surgeon should at least know sufficient of the ophthalmoscope to be able to diagnose an albuminuric retinitis, a hæmorrhagic infarction due to temporary congestion, a choked papilla, the retinitis attendant upon diabetes, the striæ and exudation of syphilis, the disseminated choroiditis of the same disease, the retinitis of pernicious anæmia, or the leukæmic retina of anæmia and leukæmia. This practical acquaintance with the use of the ophthalmoscope is of still greater value in the diagnosis of diseased conditions both during and after pregnancy.

It is well known how frequently some retinal extravasations are the result of secondary cardiac mischief, which has its source in vascular changes due to morbid states of the blood, as, for instance, in Bright's disease or diabetes. Most important are such ocular disturbances in pregnancy. This is obvious when we remember the effect produced on the blood by pregnancy, and the relative importance which it has to the safety of the patient, both as an indication of head complications and other hæmorrhagic discharges, either before or during labour."

In impressing on my readers the value of the ophthalmoscope in the early recognition of many diseases, when a timely warning might save future disaster, I went on to say:—

"I can only repeat that I have known persons whose symptoms were ascribed to amenorrhœa, hysteria, anæmia, a disorder of pregnancy, a dyspeptic state, gastric disturbance, or liver derangement, in whom an ophthalmoscopic examination and the discovery of optic neuritis, choked disc, detached retina, retinal apoplexy, pulsating vessels, Bright's degeneration, or syphilitic effusion, would have afforded a clue to a correct diagnosis."

It is many years since the distinguished French ophthalmologist, de Wecker, drew attention to the importance of examination of the retina when there were any eye symptoms complicating nephritic affections, and declared that the retinitis of malignant anæmia "might be looked upon as pathognomonic." He recorded a case of pregnancy, in which visual symptoms suggested an ophthalmoscopic examination, and from a recent retinal extravasation (likely complicating albuminuria) he suggested immediate induction of premature labour. The advice was not followed, and four days subsequently convulsions set in, and were followed by death.

In the work I have quoted from I have given different instances (with some illustrations of the fundus) of the vital importance of a retinal examination in obstetric and gynæcological work on the advent of certain symptoms in pregnancy, the menopause, and at the onset or during the presence of the catamenial flow. This, quite apart from the aid the ophthalmoscope affords in the numerous neuralgic and neurasthenic head symptoms associated with errors of refraction in women.

It is no unusual occurrence for patients to come complaining of violent headaches and severe sickness aggravated at the time of the catamenia, in which there are abnormalities of the papilla and associated hyperopia or myopia and astigmatism. Again, in the complications, cardiac and renal, which not infrequently attend on myomatous tumours of the uterus, the ophthalmoscope is of use.

It is late in the day to emphasize the need for retinal examination in the numerous cases in which it is indicated in otological work. Anatomical, physiological, and pathological reasons, apart from the clinical, establish this conclusion.

For example, in cases in which tympanic merges into and is complicated by auditory nerve and labyrinthine trouble of an anæmic, hyperæmic, hæmorrhagic, hyperplastic, exudative, or suppurative condition.

We see it indicated in the every-day occurring cases of tinnitus and vertigo, such as are present in affections of the menopause, after malarial states, in chronic alcoholism, syphilis, gout, cardiac and uterine disorders, uræmia, the sequelæ of the exanthemata, dental cases in which frequently ocular and oculomotor symptoms are present. In a case of tinnitus with unimpaired hearing we turn for explanation to cardiac and nervous sources, and here a retinal examination forms a primary part of our investigation. I make a passing allusion to such indications in otology, for the presence of more serious cerebral and spinal lesions that come under the care of the otologist, as tumours, apoplexies, effusions, thrombi, and sclerotic vascular changes, make resort to the ophthalmoscope indispensable.

It only remains now for me to apologize to the Congress for absorbing so much of its valuable time, but the promptings of an old love is my plea for pardon.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—INJURIES OF THE EYE IN WAR.

(*Fourth Notice.*)

(1) Uhthoff, W.—Two cases of lesion of the trigeminus due to shooting injury. Zwei Fälle von Trigeminusläsion durch Schussverletzung.) *Klin. Monatsbl. f. Augenheilkunde*, April-May, 1915.

(2) Dor, L.—The work of a private ophthalmic clinique of twenty beds, during seventeen months of war. Fonctionnement d'une clinique privée de vingt lits pendant dix-sept mois de guerre. *La Clinique Ophtalmologique*, mai, 1916.

(3) Collins, Sir William J.—Gunshot wounds of right orbit and maxilla. *Lancet*, June 17th, 1916.

(4) Griffith, Arthur D.—An address on injuries of the eye and orbit. *Lancet*, June 24th, 1916.

(5) Cargill, L. V.—Recent work on ophthalmology. *Practitioner*, July, 1916.

(6) Clarke, Ernest. On eyesight and the War. *Medical Press and Circular*, July 26th, 1916.

(7) **Petit, Paul.—Remote results of wounds of the eyeball in war, and especially the late consequences of overlooked intra-ocular foreign bodies. (Suites éloignées des plaies du globe dans les blessures de guerre et notamment conséquences tardives des corps étrangers intra-oculaires ignorés.)** *Annales d'Oculistique*, juillet, 1916.

(1) **Uhthoff**'s first case was a man with a basal lesion of the fifth nerve caused by a splinter of a bomb. The wound of entrance was in the left temple. At first there was loss of consciousness. After he had recovered and the wound had healed, there was persistent irritability of the right eye, with pericorneal injection and recurring epithelial erosions in the lower part of the right cornea. As the injury had been a left-sided one, and there was no obvious cause for the condition of the right eye, he was suspected of deliberately producing the ocular irritation. He complained of a sense of pressure in the eye, but there seemed to be no pain. It was found, on investigation, that there was corneal insensibility, and loss of sensibility over the area of distribution of the first and second divisions of the fifth nerve on the right side. There was also diminution of the senses of smell and taste on the same side, and the right eye had lost the faculty of lacrymation, both reflex and emotional. An X-ray plate showed the presence of a splinter just in front of the Gasserian ganglion. At a later stage there was some disturbance of sensibility in the distribution of the third division of the fifth nerve. Uhthoff explains the corneal condition in this case as of a trophic character.

The second patient received a rifle shot in the left temporal region. There was a wound of entrance at the upper-outer margin of the orbit, and a wound of exit on the right side of the neck. He bled from the mouth and nose, and was for a time unconscious. There was found to be proptosis and blindness of the left eye, and some difficulty in swallowing. Seen four months later by Uhthoff, the left eye had only light perception in the outer field. There was no direct light reflex in the left eye, but the consensual was present. There were some blood streaks in the vitreous and changes in the fundus suggestive of severe concussion. There was paralysis of the second division of the fifth nerve on the left side. The missile had apparently passed down and in through the orbit, grazing the lower posterior part of the globe, damaging the second division of the trigeminus, and then traversing the pharynx to the right side of the neck.

A. J. BALLANTYNE.

(2) **L. Dor,** of Lyons, describes very briefly the work of his private *clinique*, which, the reviewer gathers, he had handed over to the military authorities. The article calls for little comment. Perhaps the most interesting point is the praise bestowed upon the work done by a hand magnet and 4 volt battery as opposed to the giant magnet. In the restoration of eyelids, Dor has had good results from grafting fragments of the lobule of the ear. One case of ophthalmia due to caterpillar hairs was cured by *brossage* of the conjunctiva and *grattage* of the cornea.

ERNEST THOMSON.

(3) **Sir William Collins,** of London, relates the case of a private who was severely wounded on the right side of the face. The wound extended from the ear to the nose, the soft parts including the right globe and portions of the eyelids being destroyed. There were fractures of the right malar, superior maxillary, lacrymal, and nasal bones, causing a large opening between the nose and the right orbit. Seven operations were performed by the French surgeons Bettremieux and Ballenghien, who, as well as the patient,

were prisoners in Germany. Two further plastic operations were performed by Collins when the patient reached England; but eventually, and this is obviously the most interesting point, Collins designed an artificial cheek of painted and moulded copper plate, with eye attached, set in a pair of spectacles. This was made by Mr. Eastgate, of Messrs. Sillis, Strudwick, and Co. Four photographic pictures of the patient show various transformations in his appearance from the early days of the injury in October, 1914, to his dismissal from hospital wearing the appliance. These photographs form a most striking commentary on the skill with which this patient has been treated.
ERNEST THOMSON.

(4) **Captain Griffith's** article represents a lecture delivered at the University of Malta before the Conference of Medical Officers, Malta Command. It was thus deliverd to a general medical audience specially interested in war injuries. A detailed abstract would cover much well known ground, but a number of interesting points may be referred to.

After referring to the difficulties in removal of foreign bodies deeply embedded in the cornea, the author mentions a manœuvre which he employed successfully in a case where a chip of flint, the size of a pin head, was seen projecting into the anterior chamber. The anterior chamber was opened by a bent broad needle at the corneo-scleral junction, and a small sharp spoon was passed in behind the foreign body. Counter pressure was applied to the front of the cornea, and the foreign body was removed in the spoon. One must congratulate the author on his success in this obviously delicate procedure.

Another interesting case is one in which the cornea had been ruptured by a blow and the lens driven out of its capsule and out of the eye, leaving, as a result, the picture of an eye on which a successful cataract extraction had been performed. Vision, roughly tried with a convex lens of the ophthalmoscope, seemed perfect.

Speaking of injuries of retina, choroid, and optic nerve, Griffith observes that "concussion of the eye is also liable to produce a pigmentary degeneration of the retina which especially affects the macular region" and he has seen "hole in the macula" on one occasion.

Optic atrophy may be caused in three ways: 1. By fracture at optic foramen. 2. By direct division of the nerve by a transversely travelling bullet. 3. By a bullet entering the orbit and dislocating the eye, so as to rupture the nerve.

Four conditions of "shock amblyopia" can be distinguished:—1. Transient blindness from over-stimulation of the retinæ. 2. Hyperæsthesia of the retinæ resulting in blepharospasm. 3. True amblyopia (a) partial loss of vision with gradual recovery, (b) total blindness of one or both eyes, which remains unaltered for a time and is recovered from, either rapidly or instantaneously. 4. Ciliary muscle asthenia.

Wounds of the globe and sympathetic ophthalmitis are discussed along ordinary lines. Dealing with removal of the eye, the author refers to the value, from the standpoint of safety, of the operation which aims at leaving a "frill" of sclera round the optic nerve. This operation leaves a poor stump. In most cases he prefers to leave the longest stump which can be covered by the flap of conjunctiva. The operation is described.

Finally, three cases are related in which a foreign body had lodged in the orbit and the eye was spared. In two of these cases good vision was retained. In the third there was optic atrophy. In all three cases the foreign body was removed from the orbit by one means or another.

ERNEST THOMSON.

(5) A large part of the careful article on "Recent Work on Ophthalmology," by **Cargill**, of London, naturally deals with ophthalmic injuries in warfare. As he points out, the proportion of eye injuries in this war is much higher than it was in the South African war, in correspondence with the greater preponderance of head wounds, due to the type of trench and siege warfare. The frequency of injuries caused by exploding shells, as distinguished from rifle bullets, is an outstanding feature, as well as the septic and infected nature of the wounds. The pointed bullet produces injuries in several ways. For example, by its velocity; by its rotatory spin; by a peculiar spiral motion for a certain portion of its flight; and, lastly, by turning over or somersaulting when its velocity is arrested by obstruction, and especially when it does not hit the obstruction squarely.

In a comparatively small number of cases has it been possible to remove an intra-ocular foreign body and to save the eye. The electro-magnet appears seldom to have been of service, in as much as so many of the fragments are non-magnetic, or when magnetic, are multiple, or so large as to have destroyed the eye completely. In the detection and localization of foreign bodies, radiography has taken a prominent position. Mackenzie Davidson's telephone probe is spoken of with approbation. Great care is needed in dealing with eye injuries; and although examination may exhibit no evidence of penetration, a good radiogram should invariably be taken.

With regard to shell shock, there is no mental condition of wilfulness nor any conscious purposefulness, which distinguishes them from cases of malingering. Cargill believes that all that is necessary to recovery is prolonged rest amid peaceful and happy surroundings, together with optimism on the part of the attendants.

Cargill has seen retinal hæmorrhages result from the asphyxia due to severe "gassing."

A good account is given of the discussion dealing with industrial accidents and diseases at the Oxford Ophthalmological Congress, held in July, 1915. Cargill mentions the danger that attends the practice of cutting golf balls open. Among other subjects touched upon are those of familial macular degeneration, the retinitis of pregnancy, irido-cyclitis in cases of trypanosomiasis, and detachment of the retina. The difficulties which sometimes arise in glioma retinæ are illustrated by reference to cases. The researches of Manson, Mackie, and Smith upon the Wassermann reaction, in 250 cases of eye disease, are carefully described.

Among the remedies reviewed by Cargill are quinine hydrochloride, collosol argentum, iced saline in gonococcal ophthalmia, radium, and X-rays.

SYDNEY STEPHENSON.

(6) This address by **Clarke**, of London, was delivered before the Royal Institution on June 9th, 1916.

Speaking of the Army sight tests, Clarke explained that in the past short-sight has led to the rejection of thousands of otherwise eligible young recruits. It was held that the myope was useless without his glasses, and the authorities had set their faces against the wearing of such glasses. It was argued that as we had a very small army, enough men and officers could always be counted upon without including short-sighted individuals. We now recognise that a myope should wear glasses for all purposes. Clarke is not the only medical writer who has pointed out that the armies of France, Italy, Germany, and Austria-Hungary allow 6 D. to 7 D. of short-sight in combatants, whereas under our system no more than about 2·5 D. is permitted. He also lays stress upon the risk run by high hypropes, as compared with, say, a myope of 5 D. or 6 D. His aim is to secure for the future that "the wearing of glasses will never be considered a disability in the army." The difficulty of replacing lost or broken glasses will be got over by having an oculist and one or more working opticians attached to every "centre," together with a register of the glasses worn in that centre.

Clarke has something to say about "eyestrain as it affects our soldiers," the three chief causes of which are (1) low errors of astigmatism; (2) low anisometropia; and (3) small want of balance in the external muscles of the eye. All instances of eyestrain imply a loss of nerve energy. The writer. therefore, attaches great importance to removing eyestrain if such is present. He quotes some striking cures effected by simply correcting errors of refraction, notably that of a man, aged 38 years, who was struck on the head by a wet sand-bag falling from a height of eight feet. He could not walk or stand, constant headache and vertigo, inability to read or even to look at the light, with sluggish memory and mental faculties. Within one week of the trifiing astigmatism having been corrected by glasses, the man could walk and stand and the headache and giddiness had disappeared. An even more curious observation is mentioned by Clarke.—"In many cases where wounds had remained sluggish, the nerve energy required for the healing processes being used up by eyestrain, a suitable pair of glasses immediately proved a remedy.'

Discussing the effect of the war upon those rendered ineligible by age, Clarke enters into the question of accommodation and quotes his well-known diagram constructed from 1,200 cases. He holds thas a person with more accommodative power than the average for his age means that he is younger than his years, and *vice versa*. The chief causes of premature senility (as of lessened accommodative power) are:—(1) alimentary toxæmia; (2) eyestrain; and (3) worry, anxiety, sorrow, and overwork. SYDNEY STEPHENSON.

(7) **Petit**, of Caen, discusses the remote results of eyes wounded in war, with particular reference to intra-ocular foreign bodies which have been overlooked.

Some of the figures quoted by the author in the historical part of his communication will bear repetition at the present juncture.—Chenu mentions in the Crimean war, 595 cases of injury to the eye; in the Italian war, 97 cases; and 672 in the Franco-Prussian war of 1870. The proportion of wounds of the eye to wounds of the body varied, according to the war, from 0·5 per cent. to 3 per cent., and to wounds of the head from 5 per cent. to 18 per cent. Cosmetattos noted 118 instances of wounded eyes in the Græco-Turco-Bulgarian war, and in about 40 per cent. there was total loss of sight. During the present war, de Saint-Martin remarked 73 wounds of the eyes among 4,613 cases—that is, 1·36 per cent. Petit insists upon the frequency of sympathetic ophthalmitis in former campaigns. Thus, in the American war, Otis noted 41 cases, or 17 per cent., among 254 wounds of the eye. In the 1870 war, 56·5 per cent. of wounds of the eye were followed by sympathetic ophthalmitis in a period of from one to three years. The complication was mostly (80 per cent.) due to wounds complicated with foreign bodies.

According to figures, in a fifth of the cases the injury is so severe that it becomes impossible to retain the wounded eye. In the remaining four-fifths the globe may be temporily kept: such cases include wounds by small fragments, as of shell, grenades, bombs, flint (*silex*), and so forth.

Corneal lesions may leave leucomata, or in the event of perforation, adherent leucomata, and the case may go on to irido-cyclitis with all its consequences. These delayed and insidious cases of irido-cyclitis appear to Petit to be particularly frequent when, combined with a leucoma not far from the limbus, there has been an extended peripheral adhesion of the iris.

The lens may be displaced, and tension may be raised. Opacification is very common. A small foreign body may be tolerated for a long time with only a single point of opacity, but nearly always, not to say always, it necessitates surgical interference.

The sclera not infrequently forms a good protective membrane against splinters, or grains of powder, or of flint. Many cases are known in which a small foreign body has perforated the sclera without penetrating the choroid and retina, provoking or not choroido-retinal lesions.

Some gross hæmorrhages into the vitreous may clear in an unforeseen way after the fundus reflex has been lost for months, while others, on the contrary, produce a veritable organization of the medium.

Dealing with overlooked foreign bodies in the eyeball, Petit points out that in rare cases radiography has not been practised ; in others radiography has failed owing to the small size or nature of the substance ; while in a third group no suspicion has been entertained that a foreign substance had entered the eye. He quotes at length five cases where unexpectedly the eye was found to include a foreign body. In two of these cases the eye contained powder grains and in the others metallic particles.

The author concludes that the eye is to be considered as at once the most tolerant and intolerant of the organs. The intolerance may declare itself almost suddenly, and the risk of blindness may be imminent.

As regards prophylaxis, it appears that Petit devised protective glasses at the time when Terrien brought forward his proposals (see THE OPHTHALMOSCOPE, June, 1916, p. 332). They consisted of goggles, provided with a horizontal stenopaic opening and with several vertical slits, very like the Jenatzy model used by some drivers of motor cars.

In actual treatment, Petit advocates strict asepsis. He employs the conjunctival suture in suitable cases, and believes in covering the wound thoroughly. The purse string suture, however, he reserves for special cases. He speaks guardedly about the influence of subconjunctival injections in infected wounds, but his experience of that method of treatment appears to have been rather a limited one.

A strong point is made by the author of keeping under observation soldiers who have sustained dangerously wounded eyes. In addition to warning the individual men, he advocates the necessity and advisability of making it obligatory for them to present themselves for inspection before a competent authority once during every two or three months during a period of, say, two years, and then, perhaps, every six months for a further term. He thinks this plan would offer no particular difficulties in men subject to military authority.

SYDNEY STEPHENSON.

II.—THE SHAGREEN APPEARANCE OF THE HUMAN LENS.

Vogt, A.—The shagreen and shagreen globules of the human lens. (Der menschliche Linsenchagrin und die Chagrinkugeln.) *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

If the pupil is dilated, and the lens examined with the Zeiss binocular microscope, its anterior surface presents an appearance described as "shagreen." This requires a magnification of 24 to 48 diameters, and is best seen with Gullstrand's method of illumination.

Vogt, of Aarau, describes and illustrates the phenomenon. The markings consist of what appear to be alternate clear elevations and dark depressions arranged somewhat on the plan of the lens fibres, and, according to the author, are mainly at least due to the lens fibres. The appearances differ in coarseness in different individuals, but are independent of age, sex, and the presence or absence of eye disease. They are not so clearly seen when cataract is present, as they are readily concealed by diffuse reflected light. In one case of Vossius's ring opacity, following a contusion, the shagreen was absent from the site of the opacity, but reappeared on clearing of the opacity.

A further appearance is described by the author under the name of "shagreen vacuoles" or "globules." These are minute globular spots, from one-sixteenth to one-thirtieth of a millimetre in diameter, seen in the lenses of adults from 20 to 80 years of age. They differ from the globules seen in senile lenses in that they are superficial, being only seen when the shagreen itself is in focus, and that they show considerable uniformity in size. There is no tendency to confluence. Sometimes they look black, but with a slight change in the direction of the light, they look like bright globules.

A. J. BALLANTYNE.

III.—HEMIANOPSIA.

(1) **Jess, Adolf.—Hemianopic pupillary paralysis and the hemiopic prism phenomenon.** *Archives of Ophthalmology*, January, 1913.

(2) **Walker, Clifford B.—Observations on the topical diagnostic and psychiatral value of the Wilbrand test, with a new clinical instrument.** *Archives of Ophthalmology*, Vol. XLIV, No. 2, March 1915.

(3) Rönne, Henning.—Incongruence and asymmetry of the fields in homonymous hemianopsia. (Ueber die Inkongruenz und Asymmetrie im homonym hemianopischen Gesichtsfeld). *Klin. Monatsbl. f. Augenheilkunde*, April-May, 1915.

(4) **Walker, Clifford, B.—A contribution to the study of bitemporal hemianopsia, with new instruments and methods for detecting slight changes.** *Archives of Ophthalmology*, July, 1915.

(5) Woodruff, F. E.—Complete left lateral hemianopsia with glycosuria **as a result of slight trauma.** *Trans. Colo. Ophth. Congress*, July, 1915, and *Ophthalmology*, October, 1915.

(6) Stewart, Purves, and Griffith, A. D. A case of oblique hemianopia **from wound of optic chiasma.** *Lancet*, July 15th, 1916.

(7) Bourguet and Ronnaux.—Homonymous hemianopsia from serous meningitis of the right temporal fossa. Trephining Cure. (Hémianopsie homonyme par méningite séreuse de la fosse temporal droite Trépanation. Guérison.) *Annales d'Oculistique*, juillet, 1916.

(1) From the results of 8 cases of hemianopsia (2 due to lesions of the reflex arc, and 6 of central origin), carefully examined by him for the hemiopic pupillary reflex and with Wilbrand's prism test, **Jess** concludes that

Wilbrand's test cannot be used for the topical diagnosis of a hemianopsia, while the presence or absence of the hemiopic pupillary reflex is a sure diagnostic aid in the localisation of cerebral affections. The prism test was negative in all the cases, while the pupillary test gave the expected result in all cases. Jess insists that the Hess apparatus of alternate and equal illumination should be employed for the pupil test. He points out that an intelligent patient will learn by experience to look towards the blind half of the field of vision for any object which disappears from the view, thus negativing the value of the prism test, and quotes Bielschowsky's opinion that no direct transmission of retinal stimulation can occur in the absence of light perception.

(2) **Walker**, of Boston, describes a new instrument for the carrying out of the Wilbrand test, and explains the advantages which he claims for the apparatus. He summarises his conclusions in the following sentences :—

1. The distribution of field defects in anterior and posterior lesions encourages psychological factors, which greatly complicate the Wilbrand test.
2. The tendency to decrease the reaction time on repetition ; the presence of seeking movements of the eye at all times during refixation ; the presence of pseudo-refixation, angular refixation, pseudo-angular refixation, the tendency to central refixation, and pseudo-central refixation, all invalidate the Wilbrand test as a topical diagnostic reflex.
3. The results obtained by the Wilbrand test are surely a measure of certain processes of observation, memory, and thought, and are not an indication of the integrity of a definite reflex arc.
4. The possibility that this method of examination may be useful to the psychiatrist, and thereby, perhaps, contribute to topical diagnosis, is suggested.

(3) According to **Rönne**, of Copenhagen, the following are some explanations of incongruence, or apparent incongruence, of the fields in homonymous hemianopsia.

1. Apparent lack of symmetry may be due to errors in measurement which occur very easily under the difficult conditions presented by many of these cases.
2. A true incongruence, which does not signify an irregularity in the arrangement of the perceptive centre, arises when the visual path is interrupted at a point at which the fibres from corresponding points of the retinæ have not yet met. This is more likely to occur the further forward the lesion is found. The arrangement of nasal and temporal fibres in the optic nerve is not regular, and therefore, if the fibres from corresponding points are to find each other, there must be a re-arrangement of these fibres at some point. The place of this rearrangement is not yet definitely ascertained. While Henschen believes that it is not further forward than the place of entrance of the optic fibres into the external geniculate body, Rönne, on clinical grounds, thinks that the meeting often takes place at the beginning of the tract. He believes that a striking incongruence of the hemiopic fields points to a lesion of the tract in the neighbourhood of the chiasma.
3. Asymmetry is sometimes caused by the presence of islands of vision in the part of the temporal field which does not belong to the binocular field, and is not represented by a corresponding area in the nasal field of the other eye.
4. There is a form of asymmetry in which, with a total traumatic tract hemianopsia, the boundary lines of the two half fields diverge in an upward direction. This merely proves that the plane of symmetry for the hemianopsia does not correspond exactly with the saggital plane of the eyes.

5. There is occasionally seen a true incongruence due to an irregularity in the arrangement of the elements of the visual centre for corresponding retinal points.

In general, the clinical facts support the view that corresponding points in the retinæ have representation in common points in the cortical centres.

A. J. BALLANTYNE.

(4) When **Clifford Walker**, of Boston, has something to say on the subject of perimetry, it behoves those who are interested to read his paper with a notebook and a pencil at hand.

His present communication is no exception to the rule. To attempt to summarize it would merely be to spoil it. The wealth of detail is astonishing, and the work represented by the numerous charts which are furnished must have been very great. The key to the whole paper is furnished in almost the opening words. "A field examination with only one size of disc is just as incomplete as a visual examination with one size of letter." The use of discs, both larger and smaller than the so-called "normal," is strongly advocated, and the indications for the use of each are outlined. The author's new perimeter, in which a section of a sphere is substituted for the usual quadrant arm, is described at length, together with the advantages claimed for the apparatus. Walker is an uncompromising opponent of the mechanical perimeter. Few ophthalmologists would consider themselves qualified to criticize the views put forward in this paper. Fewer still could read it without interest.

R. H. ELLIOT.

(5) **Woodruff**, of St. Louis, had a patient, a man 66 years of age, who sustained a fall and strained himself in trying to preserve his balance. Within an hour or so left homonymous hemianopsia occurred. His urine was known (by repeated tests) to have been free from albumen and sugar before the accident. A few days later, he had a pronounced glycosuria, but no polyuria. The glycosuria disappeared in two months. The hemianopsia was not accompanied by motor or sensory symptoms. The author locates the cerebral lesion in the grey matter of the cuneus itself, probably a hæmorrhage, and considers the glycosuria as an expression of the severity of the shock caused by the patient's fall.

A. J. BALLANTYNE.

(6) "Lesions of the chiasma without implication of the long tracts of the brain stem occur so infrequently, that we deem the following case worthy of record."

These words introduce the description of a rare and interesting case of war injury by **Colonel Purves Stewart, A.M.S.**, and **Captain A. D. Griffith, R.A.M.C. T).** The essential facts follow:

The patient, aged 24 years, came under observation one week after injury. Apart from other wounds, one metallic fragment had entered through the right upper eyelid and destroyed the right eye. It had lodged within the cranium, where radiography showed it lying about a quarter of an inch above and a quarter of an inch in front of the upper limit of the sella Turcica. It had crossed the mesial plane and lay half an inch to the left of it. The patient suffered from septic meningitis, and examination of the exact ocular condition was at first not possible. It was early noted, however, that in addition to the destruction of the right eye, the left pupil was widely dilated and insensitive to light. It was also stated that the patient was completely blind. Twelve days after the injury, when he was able to reply to questions, it was found that the left eye had no perception of light and had a wide and insensitive pupil. Optic disc and fundus were at this time normal.

A month after the injury, and shortly after the right eye had been excised, some vision had returned in the left nasal field. Eventually, some two months after injury, it was possible to make a more careful examination. The optic disc was now atrophic. The pupil was widely dilated, but showed a hemiopic reaction. The boundary between the blind and seeing portion of the field ran through the 120° not through the 90° meridian, and apparently the fixation point was affected. Vision gradually improved from hand-movements to 5/60 and slight gains of seeing field took place, for the details of which the accompanying charts should be studied. The position at which the authors place the lesion is shown in a diagram. The lesion involves the mesial portion of the left optic nerve at its junction with the chiasma. It affects, the authors say, mainly the fibres destined for the *right* optic tract. Some of them, however, have escaped, namely, those corresponding to the upper and mesial sector of the blind field, also a smaller number corresponding to the area just above the horizontal plane, directly outwards from the fixation point. (These are represented on the chart as a dagger-like extension of the seeing field into the blind field.) In addition, a number of fibres destined for the *left* optic tract are also implicated, namely, these corresponding to the lower and mesial sector of the right half of the visual field. (That is to say, those roughly included between the lower 90° and 120° meridian, although the line of demarcation is not straight either above or below the horizontal.) ERNEST THOMSON.

(7) **Bourguet**, of Toulouse, and **Ronnaux**, of Paris, report an interesting case of homonymous hemianopsia, caused by serous meningitis, cured by trephining. The essential facts follow :—

A German soldier, aged 33 years, was wounded in the right temporal region by a bursting shell on September 27th, 1915. Consciousness was recovered in five days, and it was then found that the left leg was paralyzed. That symptom disappeared after several splinters of bone had been removed from above the zygomatic arch. Diplopia, however, supervened. When examined in December, 1915, the man complained of buzzing in the ears, slight deafness, headache, and vertigo. In walking, he oscillated now to one side and now to the other. V.=1. Fundi normal. Seen towards the end of January, 1916, nausea was present, and the headaches and vertigo were worse. Pressure on the right temporal region, particularly above the zygomatic arch, was tender. There was oscillation when the man stood upright with closed eyes. Reeling was marked. It was difficult for the patient to walk backwards. No stereognosis. The left lower extremity was weak, and its sensibility reduced. A tendency to Babinsky's sign was noted in the left foot, but otherwise the reflexes were normal. Homonymous hemianopsia (quadrant).

The existence of the hemianopsia showed that the authors had to deal with a compression of the optic paths from the chiasma to the cuneus on the right side. Compression at the level of the occipital lobe could be excluded, inasmuch as the patient presented no optic hallucinations. The absence of sensory disturbances of one-half the body allowed any affection of the parietal lobe to be put on one side. The man did not present hemiataxia, one of the most distinctive phenomena of an affection of the optic radiator (*couche optique*).

On the contrary, the authors had to do with headache localised to the temporal region as a result of traumatism, fracture. Accordingly, they reached a diagnosis of hemianopsia due to a circumscribed serous meningitis of the right temporal fossa compressing the optic tract through the intermediary of the adjoining parts. Trephining was proposed and accepted.

The operation (fully described) was undertaken on February 1st, 1916—that is to say, 127 days after the original injury. During its course, unequivocal evidence was obtained of serous meningitis. The patient made a rapid and uneventful recovery. On April 25th the hemianopsia had disappeared, along with the other symptoms. SYDNEY STEPHENSON.

IV.—METHYL ALCOHOL BLINDNESS.

Birch-Hirschfield. — Methyl alcohol blindness. *Med. Klin.*, February 27th, 1916, p. 227; abstract from *The Medical Review*, August, 1916.

Fifteen years ago little was known about the action of methyl alcohol on the eye, and there were only 12 recorded cases of injuries to the eye following its consumption, 11 of which were American. Since then cases of complete blindness from this cause have multiplied, and in 1904 Wood and Buller had collected 153 cases in America. Now about 235 cases have been published, not counting those in which death occurred before ocular symptoms could develop or could be carefully observed. There are probably also many other cases in which the condition has been overlooked, or the wrong diagnosis made.

In Germany an extensive outbreak three years ago drew attention to this action of methyl alcohol. In an asylum for the homeless 163 persons became ill after drinking spirits with which methyl alcohol had been mixed. There were 72 deaths and 4 cases of severe and permanent injury to the eyes. The cause was not detected for some time, and at first cholera, and then botulism, were diagnosed. Had the cause been detected at once and the further drinking of the spirits been prohibited, many lives would have been saved. The mistake was, however, excusable, for the symptoms were practically identical with those of food poisoning. Since the outbreak of the war there have been repeated outbreaks of methyl alcohol poisoning among soldiers in Hungary and Poland. On one occasion 200 men secured a large quantity, 50 became very ill, and 12 died. An examination of the eyes in 27 of these cases showed a small, relative, colour scotoma in 6, and severe disturbances of vision in 2.

The two following cases observed by the writer illustrate the typical course in a slight and severe case respectively.

An orderly drank a small quantity of spirits in a Polish public-house. Headache, vomiting, and diarrhœa followed, and next day he was so blind that he had to be led. While the headache persisted, vision slowly improved. His eyes were never painful. Three and a half months later there was moderate dilation of both pupils, and the reaction to light was diminished. After correction of errors of refraction, vision on the right side was 5/10, and on the left side only 5/50. On both sides there was a small central scotoma, which was relative on the right side and absolute on the left. The optic disc was very pale and slightly blurred. The central scotoma remained unchanged on both sides for several months, but the vision of the left eye improved to 6/18. Eight months after the onset he was discharged fit for active service.

A lance-corporal shared, with four other soldiers, a beaker of spirits obtained from a chemist's shop. He resumed his march without difficulty, but in the evening he suffered from headache and slight nausea. When he awoke next morning he saw things as in a dense mist, and he felt very ill. He lost consciousness, and when he recovered on the third day he was quite blind. His four companions died the day after they had drunk the spirits, which caused intestinal disturbances, convulsions, and heart failure. Whether they developed ocular symptoms or not, could not be ascertained. A month after he had drunk the spirits, the patient suffered from an attack of heart failure, which rapidly improved when camphor was injected. A fortnight later both pupils were widely dilated ; the left did not react to light, and the reaction of the right was much diminished. The movement of the eyes were free, and there was no nystagmus. Both optic discs were pale, and their outlines somewhat blurred. The retinal arteries were constricted, while the veins were slightly dilated. The maculæ showed no changes. With the right eye he could count fingers at 1·5 metres, and with the left eye at 1 meter. The right eye showed an absolute central scotoma. No improvement followed treatment with iodine, and three months after taking the alcohol, he was totally unfit for military service.

It has been estimated that 8 grammes of methyl alcohol may be toxic and 30 grammes fatal. But it is more correct to say that smaller doses of the undiluted alcohol may cause ocular disturbances in some cases, while in others a dose of more than 50 grammes may be innocuous. How great the difference of susceptibility may be is shown by Foster: 8 persons took equal shares of a mixture containing methyl alcohol and other spirits. One died comatose twenty-four hours later; another became completely blind and soon died ; while the remaining 6 suffered only from headache and vomiting, but no ocular disturbances.

Methyl alcohol is absorbed not only through the digestive, but also through the respiratory tract. Patillo has recorded two cases of poisoning by methyl alcohol inhalation. Two men were employed painting empty beer barrels with shellac dissolved in methyl alcohol. After four days and two weeks respectively, they suffered from nausea, headache, and blindness. It has been stated that methyl alcohol has produced toxic symptoms by absorption through the skin, but this is improbable ; the symptoms were probably due to inhalation. The view that the ocular symptoms are not due to the methyl alcohol itself, but to impurities, such as acetone, is also probably wrong ; for in animals the writer has produced changes in the retina and optic nerve with pure methyl alcohol.

In most cases there is an interval of several hours, and sometimes even of more than a day, before the first symptoms are noticed. This is the case even when the toxic symptoms terminate fatally. The symptoms are nearly always referred to the digestive tract, and include nausea, headache, giddiness, and vomiting. In severe cases delirium, convulsions, and loss of consciousness set in. As a rule, the ocular symptoms develop before the severe general symptoms mask the patient's blindness. The ophthalmoscopic demonstration of optic neuritis is of great diagnostic importance, as practically all the other symptoms due to methyl alcohol poisoning are common to other acute conditions. When severe disturbances of vision suddenly develop, and a central, absolute scotoma, with limitation of the peripheral field of vision, is found associating with optic neuritis and signs of gastro-intestinal poisoning, methyl alcohol should be suspected.

Unfortunately, an early diagnosis does not benefit the patient much, for the alcohol is so quickly absorbed that irrigation of the stomach is practically valueless, unless undertaken at once. In one case castor oil, acting as an emetic, is said to have been beneficial. Pilocarpin, inhalation of oxygen, diaphoresis, digitalis and camphor, and rectal injections of hot coffee or saline solution may diminish the general collapse, but can scarcely be expected to mitigate the ocular symptoms. The common view that potassium iodide and strychnine check the development of secondary atrophy is unjustified, as well as the belief in galvanism with which Zeigler claims to have effected improvement in one case. In most cases the fate of the patient's eyes is sealed before treatment. This form of poisoning should be prevented by legislation. The frequency of methyl alcohol poisoning in different countries depends on laxity in prohibiting its improper sale.

V.—SYMPATHETIC DISEASE.

(1) Decherd, Henry J.—Sympathetic optic neuritis or transferred papillo-retinitis associated with only a mild iridocyclitis. Report of a case. *Ophthalmic Record*, August, 1914.

(2) Brock, Walter.—Clinical observations on idiopathic irido-cyclitis and sympathetic ophthalmia. *Archives of Ophthalmology*, Vol. XLIV, No. 1, January, 1915.

(3) Keutel, Johannes.—Is there such a thing as sympathetic amblyopia? (Gibt es eine sympathische Amblyopie?) *Klin. Monatsbl. für Augenheilkunde*, February-March, 1915.

(4) Keutel, Johannes.—Is there a sympathetic amblyopia? *American Journal of Ophthalmology*, July, 1915, from *Klin. Monatsbl. f. Augenheilkunde*, Vol. LIV, page 250.

(5) Dunn, Percy.—The prognosis in sympathetic ophthalmia. *Lancet*, March 18th, 1916.

(6) O'Connor, Roderic.—Sympathetic uveitis: a possible explanation. *Ophthalmic Record*, April, 1916.

(7) Dres, Demaria, Enrique B. and Ferro, Publio, B.—Sympathetic choroiditis. Choroiditis simpatica. *Boletin de la Sociedad de Oftalmologia de Buenos Aires*, 1916.

(8) Gifford, H.—The biological theory of sympathetic ophthalmia. *Ophthalmic Record*, July, 1916.

(1) **Decherd,** of Texas, reports a case of transferred papillo-retinitis believed by him to be due to staphylococcic infection, which travelled from one eye to the other by way of the optic nerve apparatus. The original injury consisted of a perforating wound by a piece of metal involving the iris, ciliary body, and lens of the left eye. Forty days after the injury, a mild irido-cyclitis with papillo-retinitis was noted in both eyes. In one week, the condition appeared to have come to a standstill; the retinal veins were large and tortuous, and the arteries seemed smaller than usual. "Completely covering the optic disc and surrounding it for 5 or 6 millimetres externally, internally, above, and below almost to the ciliary process, was a beautiful, white, mouldy-looking exudate extending into the vitreous and intimately associated with the swelling and œdema of the nerve-head and surrounding retina and choroid." Vision deteriorated from R.=20/20 and L.=20/100 to R.=6/200 L.=20/200 in two days. In three months it had risen to R.=20/30 L.=20/50. Treatment consisted in the employment of laxatives, hot baths, atropine, hot fomentations, protiodide of mercury, potassium iodide, salicylates, dionin, calomel, dieting, outdoor sleeping, and subconjunctival injections. The patient said he noticed immediate improvement after the subconjunctival

injection of three or four minims of cyanide of mercury (1 : 5000), and was always anxious to get his injections. The author had consistently advised excision of the exciting eye, but the advice was ignored.

J. JAMESON EVANS.

(2) **Brock**, of Stuttgart, discusses Elschnig's theory of the occurrence of sympathetic ophthalmia, as the result of over-sensitiveness of the uvea, resulting from autogenous resorption of uveal tissue from the eye first diseased. He quotes and endorses v. Hippel's rejection of Elschnig's views as to the significance of indicanuria, nor has he any sympathy with Elschnig's opinion that there is no real difference between idiopathic and sympathetic iritis, either in regard to the involvement of both eyes or to the course and outcome of the disease. The present paper is devoted to exposition of his views on the difference between these two forms (idiopathic and sympathetic) of iritis.

R. H. ELLIOT.

(3) From a critical survey of published material, Schirmer (*Graefe-Saemisch*) excludes from the category of "Sympathetic Amblyopia" all but twenty-five cases, and on the basis of these he gives the following picture of the condition.—'The exciting eye is painful and irritable, but with no ascertainable inflammation. There is not always a history of injury. The interval between the affection of the two eyes is usually several years. Sometimes, just before the onset of the sympathetic trouble, there has been a fresh irritation of the exciting eye. The reduction of V.A. in the sympathising eye is moderate. Sometimes there is concentric contraction of the field, and scotomata may be present. In most cases the condition has been relieved by enucleation of the exciting eye, but also in some cases by such remedies as iron and quinine, and in each case there was rapid or sudden increase in the V.A.' This description, and the fact of sympathetic amblyopia, have been generally accepted, but there were dissentient voices. Peters (1912) held that the amblyopia and the field defect could be taken as evidence of traumatic neurosis.

Keutel, of Rostock, criticises the material in view of this opinion. In many of the reported cases the amblyopic (sympathising) eye was in an irritable watery state, which would, he says, in itself explain the reduction of V.A. Where the field is contracted, the question of traumatic hysteria comes in. In other cases further investigation has discovered organic changes to explain the loss of vision, or simulation has been proved. Keutel concludes that there is no such entity as "sympathetic amblyopia."

A. J. BALLANTYNE.

(4) The article by **Keutel**, of Rostock, is one of an irritating type which sets out to prove a contrary by finding some fault or other in every recorded case which is in favour of the original contention.

It will suffice to quote the conclusions : "It seems to me to be rather the right moment to strike the independent disease picture of sympathetic amblyopia from ophthalmic literature. The cases in which after enucleation vision promptly improved, can be explained mostly by the disappearance of the symptoms of irritation (photophobia and lacrimation), symptoms which interfere mechanically or functionally with vision. Or there may be suggestive influences which induced a rapid improvement of the amblyopia and the simultaneous contraction of the visual field. We must not forget that when we propose the removal of a painful eye to a patient, in order to remove present suffering, or to prevent serious consequences to the other eye, we usually assure him that thereafter everything will be well, there is a strongly suggestive effect in this which we must not underestimate" (*sic !*).

ERNEST THOMSON.

(5) The article by **Dunn**, of London, is one which is not readily abstracted. Some only of the points will be mentioned. For the rest the original should be consulted.

In the first place, Dunn substitutes the term infective cyclitis for sympathetic ophthalmia, since no one now believes that the disease is sympathetic. The disease is becoming rare with time, the increasing rarity corresponding with the practice of aseptic and antiseptic principles in wound treatment. Its virulence is also modified, and the disease has become curable. In mild cases recovery is possible, even to the extent of leaving no trace of the effects of the attack, and the retention of normal vision in each eye. Speaking of the varying results of enucleation in the way of checking the disease in the uninjured eye, Dunn says that in the light of infective origin these apparent divergencies become easy of explanation if we accept the premise that the disease and its effects are controlled by the virulence of the infecting organism and the toxin it creates. Regarding the interesting subject of relapses, the author points out that the effect of the changes caused in the ciliary body by an infective plastic irido-cyclitis can only be to induce a condition of diminished resistance, rendering them liable to exhibit reaction when exposed to any source of metabolic toxæmia. The recurrent attacks of so-called sympathetic inflammation may be attributable to this cause, the relapses occurring independently of, and secondarily to, the primary infection. For example, relapses could hardly fail to occur in eyes damaged by sympathetic ophthalmitis when the patient was suffering from the effects of alveolar pyorrhœa. Sympathetic irritation Dunn considers to differ only in degree from sympathetic ophthalmia. The apparent difference in the manifestations of the signs in each case is readily explainable on the hypothesis of the varying virulence of the toxin to which the morbid effects are due. "We may reasonably assume that the toxin conveyed through the medium of the blood from one eye to the other causes symptoms in accord with its virulence, and this hypothesis merely coincides with what we should expect of an infective disease." ERNEST THOMSON.

(6) Somehow or other the theory by which **O'Connor**, of Oakland, Cal., U.S.A., endeavours to explain sympathetic uveitis sounds strangely familiar. He was led to adopt it by Rosnow's observation, namely, that micro-organisms producing an inflammation in an organ develop a specific affinity, so that on injecting them into the bodies of other animals, they usually produce infection in the organ from which they were originally derived. For example, fourteen strains from appendicitis gave rise to lesions in the appendix in 68 per cent. of the rabbits injected, as compared with only 5 per cent. of appendix lesions when the animals were injected with strains isolated from sources other than cases of appendicitis.

O'Connor's theory may be stated as follows :—

1. The organisms in the exciting eye, after a variable period, develop their specific affinity for uveal tissue.
2. After another variable period they gain access to the blood stream and are conveyed to all parts of the body.
3. The cells of the uveal tract, having an elective affinity for these organisms, take the bacteria out of the circulation as if by magnetic force ("adsorption").
4. The organisms, through their affinity, are able immediately to start the characteristic inflammation in the uveal tract.

Speaking of the foregoing theory, O'Connor somewhat naïvely says, "at least it is expected to arouse interest and criticism."

SYDNEY STEPHENSON.

(7) **Demaria**, of Talcahuano, and **Ferro**, of Cangallo, have published an account of a case of this rare form of sympathetic inflammation.

H. GRIMSDALE.

(8) **Gifford**, of Omaha, points out that the theory brought forward by O'Connor (see abstract 6 above), was enunciated by him in 1899, 1902, and 1913.

SYDNEY STEPHENSON.

VI.—"HOLE" IN THE OPTIC DISC.

(1) **Holloway, T. B.—Hole in the disc associated with vibration of an overlying membrane.** *Ophthalmic Record*, May, 1915.

(2) **Claiborne, J. Herbert.—Hole in the disc.** *Annals of Ophthalmology*, April, 1916.

(1) The unique feature of the case of hole in the optic disc described by **Holloway**, of Philadelphia, was the pulse-like movement of the grayish veil-like membrane over the excavation. This movement was attributed to an impulse transmitted from the central retinal vessels to the overlying membrane.

J. JAMESON EVANS.

(2) In an ametrope of 18 years, **Claiborne**, of New York City, found a punched-out hole on the outer side of the right optic disc. The depth, on an average, was 3 D. He agreed with Remak and Szily in thinking that the defect is allied to coloboma of the optic disc. He describes it, indeed, as "partial coloboma of the optic disc."

SYDNEY STEPHENSON.

VII.—SYPHILIS OF THE EYELIDS.

(1) **Finlay, C. E.—Double chancre of the eyelid.** *Archives of Ophthalmology*, July, 1915.

(2) **Alter, Francis W.—Palpebral syphilis: a review with case report.** *Transactions Twentieth Annual Meeting American Academy of Ophthalmology and Oto-Laryngology*, 1915.

(3) **McGriger, H. J. and Livingstone, Donald M.—A case of palpebral chancre.** *Lancet*, March 20th, 1916.

(4) **Rosenbaum, J.—Palpebral syphilis.** *Ophthalmic Record*, July, 1916.

(1) **Finlay**, of Havana, describes a case of double chancre of the eyelid, which he thinks was contracted by the use of a soiled towel, and possibly through the intermediary of a stye. He gives the literature dealing with chancre of the lids, and details the various modes of transmission in the recorded cases. These are from (1) near relatives affected with syphilis, (2) throat operations (in surgeons), (3) popular treatment of eye troubles by licking them (*sic !*), (4) kissing, (5) street contamination due to spitting, and (6) syphilitic contamination of inflamed lids.

The reviewer met many years ago with a case in which a surgeon contracted eyelid syphilis, whilst operating on some glands in the neck. Like other cases of a similiar kind, it was not published, as its publication might have given offence to an unfortunate colleague. Finlay has found eight other cases of double chancre, and one of triple chancre in literature.

R. H. ELLIOT.

(2) **Alter**, of Toledo, has an interesting paper dealing with the palpebral manifestations of syphilis.

Primary syphilis of the eyelids, although relatively unusual, is common enough to enlist our very early attention. From 3 per cent. to 5 per cent. of all extra-genital primary affections occur upon the eyelids. The facts that should make us look with suspicion upon a lesion are a marked degree of indolency and chronicity, together with the enlargement of the preauricular and submaxilliary glands. The lesion may resemble in appearance a kind of combined chalazion and hordeolum. The cilia are usually absent from the affected part. The clinical diagnosis is strengthened by finding an indurated base to the ulcer. The diagnosis should be established or disproved by the search for the *Spirochæta pallida*. The Wassermann reaction in primary syphilis can seldom be obtained until the third week. The commonest cause of a primary lesion on the eyelids is kissing, and the evil practice of attempting to remove a foreign body from the lids or the cornea by means of the tongue; but it is as well to bear in mind "that the sources of infection are as various as the possibilities for placing the spirochæte in contact with the eye."

An ordinary chancre (for obvious reasons) seldom develops upon the external skin, but is almost always situated in the intermarginal space, the canthi, or upon the tarsal conjunctiva. A diagnosis of mumps might almost be made from the swollen state of the preauricular and the submaxillary glands. The lesion, as a rule, is marked by indolence and obvious involvement of the neighbouring glands. Difficulties, however, may arise. It may be confused with hordeolum, chalazion, tuberculosis, vaccine pustule, etc. Double chancre of the eyelid is unusual. The cases are very important where an interstitial keratitis follows a chancre of the eyelid or conjunctiva, and it was shown some years ago by E. Treacher Collins that the keratitis was more likely to occur when the primary sore was in the neighbourhood of the eye than elsewhere.

Tarsitis is the commonest form of tertiary involvement. The lids are slowly and painlessly hypertrophied, and the integuments become tightly stretched and hyperæmic. Ptosis is usually well marked. The eyelashes tend to fall out. On palpation, the tarsus is felt to be enlarged and of cartilaginous consistency. It is surprising how often these lesions are cut into with an idea of finding pus. Tarsitis has been met with in a child of three months.

Mucous patches have been found upon the conjunctiva. Thus, in a recent case, by Hanford McKee, the *Spirochæta pallida* was found in scrapings from the conjunctiva. The latter rapidly got well when the patient was put upon general anti-syphilitic treatment. The curious case of tubercular iodism simulating gumma of the eyelid, reported by Sydney Stephenson, is mentioned. Finally, syphilitic fissure of the external canthus may occur, and rupia has been described as involving the eyelids.

In the diagnosis of these several affections it should be borne in mind that in the late tertiary stages the Wassermann reaction can be obtained only in about two-thirds of the positive cases. These are the circumstances under which the luetin test is of value as a supplementary aid in the diagnosis. Under the head of prognosis and treatment, Alter again wishes to emphasize the fact that the intravenous injection of salvarsan stands in the first rank, supplemented by inunctions of mercury, and last, but not least, by the administration of liberal doses of potassium iodide.

SYDNEY STEPHENSON.

(4) A man, aged 32 years, consulted **Rosenbaum,** of Montreal, on account of ulceration of the eyelids. A number of punched-out ulcers occupied the ciliary margins of right upper and lower eyelid and of the skin below the lower eyelid. There were no eyelashes. The edges of the ulcer were irregular in outline and undermined, and the floor was covered with a yellow crust. There was no history of syphilis, but the Wassermann reaction was strongly positive. The condition had been present for fourteen months, and was preceded by what may have been a chancre on the margin of the right upper lid. The condition was cured in ten days by one injection (intravenous) of salvarsan, followed by mercuric inunction and potassium iodide.

SYDNEY STEPHENSON.

VIII.—ON CHANGES IN THE OPTIC NERVE IN INTRA-OCULAR INFLAMMATION.

Fuchs, E.—On changes in the optic nerve in exogenous intra-ocular inflammation. (Ueber Veränderungen des Sehnerven bei ektogener intraokularer Entzündung.) Graefe's *Archiv für Ophthalmologie,* Vol. XCI, November, 1915.

The fate of an eye which gets inflamed after perforating injury depends on the changes in the posterior part of the eye. If that part gets severely inflamed, the eye will be lost: in acute cases by panophthalmitis, in more chronic ones by atrophy. When the posterior part is unchanged, recovery is possible to a certain extent.

We judge of the necessity of enucleation of an inflamed eye by examination of the tension; the inflammatory symptoms, especially the exophthalmos; and the light perception.

The optic nerve shows alterations in severe cases of endophthalmitis as well as in slight cases of traumatic iritis. The changes of the optic nerve in cases of exogenous inflammation are not described in the books on pathological anatomy of the eye (Greeff, Ginsberg, Parsons), and are to be found only in special articles. They are very important, because they may damage, and even quite extinguish, the function of the nerve, and when in such a case the eye is removed because the light perception is lost, it is possible that the enucleation was not necessary.

Fuchs, of Vienna, asks whether in slight cases in which only the anterior part of the eye is diseased, the diminishing of the light perception may be attributed to functional damage; for instance, by toxins, just as he accepts such a toxin influence in cases of hæmorrhage in the vitreous body with total extinction of the light perception. Schreiber believed that even in slight cases anatomical changes may be present.

To answer this question, which is important as regards prognosis, Fuchs went over his material of exogenous intra-ocular inflammation. He examined forty-two eyes, all but one of which had suffered from perforating injury. They were enucleated either on account of beginning panophthalmitis or threatening sympathetic ophthalmia.

In some cases the examination showed that no severe disease of the posterior part of the eye was present, although the light perception had been very bad or totally absent.

The cases were divided into three groups:

I. Endophthalmitis; purulent inflammation in the vitreous body—twenty-seven eyes.

II. Chronic, traumatic, infiltrating iritis—three eyes. Fuchs uses this name instead of iritis traumatica.

III. Ordinary traumatic iritis—twelve eyes.

The first group is by far the most numerous, although all cases with retinal detachment were excluded.

The microscopical sections were coloured with hæmatoylin-eosin, and van Gieson and Weigert's method.

Eight optic nerves were cut in pieces directly after the enucleation and coloured with Weigert, Marchi, and Bielschowsky; all belonged to eyes lost by perforation by iron or glass.

Degeneration of the optic nerve could be found in every case of endophthalmitis, and also in every case of traumatic iritis. In one eye degeneration was present within three days after the injury. In four days the whole optic nerve showed signs of degeneration. The amount of degeneration was not always proportional to the functional damage.

The cause of the degeneration of the optic nerve is not toxic nor inflammatory, but is ascending from the retina and the papilla.

In this important article we find a description of the results of the histological examination of papilla and optic nerve, and at the end of it Fuchs reaches the following conclusions:

In the first group, endophthalmitis, the papilla is always affected with severe inflammation, and the optic nerve becomes more or less degenerated. The atrophy of the optic nerve is not a consequence of the atrophy of the globe, but begins in the first days of the intraocular inflammation.

In the second group, the chronic, infiltrating, traumatic iritis, the severe alterations of the optic nerve can be easily understood, because the toxins act, although less intensively, during a much longer time on the papilla.

In the third group, the simple traumatic iritis, it is surprising to see that the optic nerve is so often, and frequently so severely, affected, whereas the alterations in the posterior part of the eye are so slight.

As already stated, in all these cases, except one, the inflammation of the anterior part of the eye was caused by perforating injury. The produced toxins act in different ways on the walls of the anterior chamber. In the slighter case the cornea is not affected at all. In more severe cases the endothelial cells and the corneal corpuscles in the posterior layers die, especially towards the centre of the cornea.

This disease and the accompanying slight infiltration of the cornea may recover totally.

The iris, on the contrary, becomes the seat of severe inflammation, with infiltration of the tissue, and abundant exudation from the surface. This inflammation is not apt to extend itself to the tissue of the uvea. Often the inflammation is not transmitted to the ciliary body, or only in the loose tissue at the iris root in the neighbourhood of the circulus arteriosus iridis major; although it is still possible that from hence it extends at the external and internal surface of the ciliary muscle.

The inflammation of the ciliary processes, which is the sequel of the cyclitic exudation and the cyclitic membranes, is not caused by extension of the inflammation of the iris. It is an inflammation of the retinal part of the ciliary processes, and is therefore always superficial. Even the recesses between the ciliary processes are often free. This inflammation is always a direct consequence of the action of toxins on the surface of the ciliary processes, and is for that reason especially found when the infection focus is in the vitreous. When the infection is in the anterior chamber, and not very virulent, the inflammation of the superficial layers of the ciliary body will be absent or very slight. This is the reason why, in the cases of the third group, although the inflammation of the iris may be severe, the ciliary body is less or not at all affected.

The affection of the posterior part of the eye in cases of the third group is caused by toxins which pass from the anterior chamber through the pupil backwards. In one of Fuch's cases, a keratitis caused inflammation of retina and optic nerve, because the pupil was open ; in the course of this inflammation the pupil was closed, and therefore caused a second, although much more even, keratitis not affecting the posterior part of the eye.

The toxin, which passes through the pupil meets first the ciliary body, and then the retina and the papilla.

In cases of the third group there is found little inflammation of the retina, but much more inflammation of the disc and degeneration of the optic nerve. This degeneration is a consequence of the affection of the fibres and ganglion cells of the retina ; these are damaged by the toxins, which are not potent enough to give rise to inflammation. Only the disc gets inflamed, perhaps because the toxins are here stronger (in consequence of the canalis hyaloideus ?).

The results of Fuchs' examination give the following practical applications:

In endophthalmitis the state of the optic nerve does not matter, because the eyes are lost.

In cases of simple traumatic iritis the optic nerve may be affected. Fuchs does not say this always occurs. In his eyes this was the case ; but the eyes were enucleated only when the light perception was bad ; the state of the optic nerve, when the light perception is good, has yet to be examined.

The state of the optic nerve may be investigated by the ophthalmoscope and by examination of the light perception. The ophthalmoscope can be used only in the few cases in which the media are clear enough to permit a sight of the disc. Then we can see whether inflammation exists or not, but the other alteration, the degeneration of the nerve fibres, cannot be seen. The degeneration does not depend on the swelling ; so that the swelling does not give a measure for the degree of the degeneration. Therefore, it is possible that a case, although the swelling is strong, may heal with good visual acuity, when the degeneration is not severe.

In most cases the ophthalmoscopical examination is impossible, and then we can judge the state of the optic nerve only by the light perception.

Unhappily this cannot be trusted, because in acute cases there can be not only anatomical change but also functional damage of the nerve fibres, and we cannot distinguish these two factors from each other. When we observe the patients a longer time, then we know that important improvement of the visual acuity is due to the vanishing of functional alterations ; the degenerative changes are, for the greater part, irreparable. For instance, in one of Fuchs' cases the visual acuity improved from doubtful light perception to finger-counting at 50 cm., because the functional alterations improved ; in the meantime perception of red was absent, in consequence of the atrophy of a part of the nerve fibres, which also caused the still bad visual acuity.

Old cases showed also by anatomical examination the damage of the optic nerve. Schreiber, of Heidelberg, says the disproportion between visual acuity and the opacity of the media, after inflammation of the cornea, is due to irreparable nerve fibre alterations. Fuchs means this conclusion can be extended to include all kinds of exogenous inflammation of the interior of the eye. It is therefore not admissible to give the prognosis of the visual acuity after an operation, only on account of the optical proportions which may result, but we should also pay attention to the state of the optic nerve.

The affection of the optic nerve in inflammation of the anterior part of the eye is not only found in exogenous, but also in endogenous iritis.

A second important fact is that we are accustomed to take the light perception as a measure of the necessity for enucleation, in the sense that the state of the perception shows the degree of inflammation of the posterior part. Diminution and disappearance of the light perception is taken as a token of endophthalmitis. This is not right, even total loss of light perception may be present with almost unchanged posterior part. Neither the tension of the globe nor the external signs of inflammation make us sure about this point. Thus, even in a case of abscess in the vitreous, the inflammatory signs may be scarce

We must therefore confess that up to now we cannot diagnose in an acute case of exogenous inflammation, accompanied with severe iritis, whether endophthalmitis is present or not ; the course of the case alone makes this clear to us. For this reason eyes will often be enucleated, which could remain, and in which a small amount of visual acuity would return. Notwithstanding, Fuchs will not advise not to use the light perception as the indication for enucleation, because in the greater part of the eyes loss of light perception is due to endophthalmitis, and the saving of a few eyes, which did not need to be enucleated, would be compensated by an increase of sympathetic ophthalmia. J. VAN DER HOEVE.

IX.—TRACHOMA.

(1) Axenfeld, Th.—Is there such a thing as immunity to trachoma? (Gibt es eine Immunität beim Trachom?) *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1915.

(2) Crisp, William H.—The nature of trachoma. *Ophthalm. Record*, April, 1915.

(3) Alter, F. W and Bonser, William O.—A résumé of the trachoma bodies as the ætiologic factor in trachoma, and in the so-called inclusion blenorrhea. *Annals of Ophthalmology*, April, 1915.

(4) Buchanan, Leslie.—A note on trachoma. *Glasgow Medical Journal*, August, 1915.

(5) Edmondson, Edward Everett—Some clinical studies on the trachoma question, with reference to conditions in Southern Illinois, U.S.A. *Ophthalmology*, October, 1915.

(6) Allport, Frank.—The treatment of trachoma. *Ophthalm. Record*, October, 1915.

(7) Lewis, F Park—Trachoma: A social menace. *Medical Review of Reviews*, June, 1916.

(1) **Axenfeld**, of Freiburg i.B., points out the difficulties which confront us in any attempt to settle the question of immunity to trachoma.

Contrary to the belief which used to be general, that there was such a thing as racial immunity, *e.g.*, in the negro, Axenfeld holds that the existence of such immunity has now been disproved. The same, he says, is true of climatic immunity. Immunity on the part of individuals is difficult to prove, when due account is taken of factors other than immunity which might influence the occurrence of infection in each case. The cases of unilateral trachoma offer an interesting problem. It is true that in experimental work it has sometimes been found impossible to infect the second eye, but clinically the absence of the disease from one eye does not necessarily imply immunity on the part of that eye. Often the second eye becomes affected after many years. The possibility that the virus has become attenuated in its passage through the first affected eye must also be borne in mind. It is generally believed that there is no acquired immunity against trachoma, since an eye can be infected a second time ; but here we are met with a difficulty that we may be dealing with a recurrence and not with a re-infection.

Probably the only generalisation that can be drawn is that there is no absolute immunity against trachoma, but we cannot exclude the possibility of relative immunity. A. J. BALLANTYNE.

(2) **Crisp**, of Denver, reviews the historical and pathological literature of trachoma, and cites a case of some interest.—A man, 40 years of age, suffering from intense blepharospasm, was brought to him with ocular inflammation of some seven years' duration. The corneæ showed several opacities and some vascular pannus and a fair amount of pericorneal injection. Eversion of the upper lids showed characteristic old trachoma scars on the tarsal surface. Perhaps the most striking feature of the case was the patient's tendency to sneeze violently and repeatedly whenever the eyes were exposed to even moderately strong light.

Treatment by the recognised medicaments, and even excision of the tarsus, produced little or no improvement. As the patient had a deflected septum nasi a submucous resection was performed, and this was followed by immediate improvement in the condition of the eyes and in the patient's general health. " It seems at least possible that the whole series of ocular disturbances in this case—typically trachomatous in the main as they appear to have been—were secondary to the surgical defects of the nose."

J. JAMESON EVANS.

(3) **Alter** and **Bonser**, of Toledo, discuss the history of the investigation of the *rôle* played by the trachoma bodies, and the present status of those bodies. Their principal points would appear to be (1) that these bodies assume a variety of forms ; (2) that they are always found in close proximity to the nucleus ; (3) that they tend to surround and to invade the nucleus ; (4) that, as the invasion proceeds, there is a gradual elimination of the plastin, or blue bodies, and a triumph of the red bodies ; (5) that the occurrence of these bodies in diseases other than true trachoma and inclusion blennorrhœa is doubtful, as evidenced by the failure of inoculation experiments ; and (6) that the factor of mixed infections has not always been duly allowed for, in dealing either with inclusion blennorrhœa or with true trachoma. R. H. ELLIOT.

(4) **Buchanan**, of Glasgow, writes a useful short article on the characteristics of trachoma, inspired by the greatly increased frequency of this disease in Glasgow during the past few months. S. E.

(5) **Edmondson's** paper is an abridgement of his M.D. thesis. He tells us that both tuberculosis and trachoma are common in Southern Illinois, and, that as it had been discovered that trachoma often improved under anti-tuberculosis treatment, it seemed desirable to investigate the relationship

between these two diseases. With this object in view the author settled in the district in question, and gives the results of his studies. He found that almost all the trachoma patients gave a positive response to tuberculin, but that a focal reaction was never obtained. He thinks that the frequency of the general tuberculin reaction can be accounted for by the frequency of tuberculosis in the population (one in eight dies of tubercle), and that all that one can say is that the scrofulous soil is the one best prepared to favour the action of the trachoma virus.

The subject of treatment is also dealt with. After having removed the granulations by operation, he treats the pannus by a weekly application of 5 per cent. dionine ointment, increasing the strength to 10 per cent. when its effect begins to diminish. The pannus is in this way always cleared within three months. Carbon dioxide snow, *grattage*, and "expression" followed by a daily instillation of copper sulphate (1 per cent.), dissolved in glycerine and water, are among the methods of treatment employed.

A. J. BALLANTYNE.

(6) In the opinion of **Allport**, of Chicago, all drugs may be practically excluded as curative means in the treatment of trachoma. The consideration of the subject therefore resolves itself into surgical measures of one kind or another, not forgetting that in X-rays and radium we possess remedies that may some day be more valuable than they have proved themselves in the past. The object aimed at is the elimination of the trachoma without materially and permanently injuring the conjunctiva. Allport's method consists in the frequent expression of the lids with Kuhnt's forceps—the tissues being *squeezed*, not stripped, as is done when Knapp's, Prince's, and Noyes's forceps are used. After thoroughly squeezing out all the granules, the everted lid is lavishly powdered with boric acid, which is then gently rubbed into the tissues by means of a child's small soft tooth brush. The powder is washed off with water and ice-cold applications serve to control the re-action. After the immediate effects of the operation have subsided, applications of copper stick are made. The lids are thoroughly washed with water and a dilute citrine ointment in cod liver oil (Brown's ointment) is massaged into the eye and lids.

J. JAMESON EVANS.

(7) This article by **Lewis**, of Buffalo, is written from the popular and sociological standpoint, and is illustrated with figures of a popular character. It is addressed as much to the laity as to the general practitioner of medicine. A broad general idea of the lines on which the communication is conceived may be gathered from the headings as quoted below:

Distribution of trachoma in the United States.
The prevalence of trachoma.
The economic importance of trachoma.
Trachoma among reservation Indians.
Trachoma in the workshops.
Methods for preventing the spread of trachoma.

SYDNEY STEPHENSON.

X.—REMEDIES.

Seventh Notice.

1 Gifford, H.—The therapeutics of sympathetic ophthalmia. *Ohio State Medical Journal*, March, 1915.

(2) **Lucas, Justo.—High frequency currents in ophthalmic practice. (La corriente de alta frecuencia en oftalmologia.)** *Arch. de Oftal. Hisp.-Americanos*, July, 1916.

(3) **Wieden, Drs. — The pathogeny of hypopyon-keratitis and its treatment by optoquine. (Patogenia de las queratitis con hipopion, su terapeutica mas eficaz por la optoquina.)** *Arch. de Oftal. Hisp.-Americanos*, August, 1916.

(4) **Harman, N. Bishop.—The economical use of solutions of costly alkaloids for ophthalmic purposes.** *British Medical Journal*, August 5th, 1916.

(5) **Darier, A.—Sulphur re-established in syphilis as a valuable adjunct to arsenical preparations, mercury, and iodides. How to use it. (Le souffre rehabilité dans la syphilis, adjùvant prècieux des arsenicaux, du mercure et des iodures. Mode d'emploi.)** *La Clinique Ophtalmologique*, mai, 1916.

(6) **Delorme.—The treatment of purulent gonococcal ophthalmia by the vaccine of Nicolle and Blaizot. (Le traitement de l'ophtalmie purulente gonococcique par le vaccin de Nicolle et de Blaizot.)** *La Clinique Ophtalmologique*, mai, 1916.

(7) **Hirsch.—Embarin in sympathetic ophthalmitis.** Abstract *Amer. Medicine*, July, 1916, *Medizinische Klinik*, January 30, 1916.

(1) This article by **Gifford,** of Omaha, deals with many more points concerning sympathetic ophthalmitis than its title would lead one to suspect. However, as to the treatment of the disease, he reiterates his belief in the virtues of large doses of sodium salicylate (one grain a day for each pound of the patient's body weight), acetyl-salicylic acid, or some other derivative of salicine. Three cases have been treated with phenyl-quinolin carboxylic acid (atophan) in doses of 150 grains a day, divided into five doses each of 30 grains. Hexamethylene-tetramine (urotropine) may be tried when the more efficacious salicylates or atophan cannot be administered. A similar remark applies also to salvarsan or neo-salvarsan. The action of tuberculin and of subconjunctival injections of mercury cyanide or of sodium iodide is discussed by the author. To the last-named he objects that their employment obscures the clinical picture of the condition, although he does not deny their value in desperate cases. Gifford has not abandoned mercurial inunctions, administered in conjunction with the other remedies.

SYDNEY STEPHENSON.

(2) **Justo Lucas** has noted very good effects from the application of high frequency currents to corneal ulcers which were rebellious to other treatment. He has seen photophobia disappear and meiosis relax, while the scar left after the treatment is less than after any other. He uses Sanchez apparatus with vacuum electrode. H. GRIMSDALE.

(3) In this paper, **Drs. Wieden**, of Valencia, deal with the treatment of hypopyon. They show how deadly the pneumococcus is, and how frequently the presence of dacryocystitis complicates and causes the corneal disease. They point out that Morgenroth has shown that certain derivatives of quinine have a special power against the pneumococcus, and that the best of these substances is ethyl hydrocupreine, or optoquine. They have tried the alkaloid and also a salt thereof, in 1/100 solution, in the treatment of hypopyon-keratitis. They consider it to be by far the best drug yet known to

us against this very dangerous disease. It stops the process very rapidly, so that the resulting scar is no larger than the original ulcer. The electro-cautery always gives a somewhat larger scar, and its use is made unnecessary by the use of optoquine. H. GRIMSDALE.

(4) Instead of the usual distilled water, **Harman**, of London, recommends that solutions of such alkaloids as homatropine, cocaine, etc., be made up with the following liquid : distilled water, 1 pint ; methyl salicylate, 2 grains ; oil of gaultheria, 2 minims ; and tincture of iodine, 2 minims.

He finds viscid solutions more economical in use than watery ones. The usual agent employed by him to secure cycloplegia is a 2 per cent. solution of the alkaloids homatropine and cocaine in castor oil. It is now difficult to procure the pure alkaloid homatropine, while the hydrobromate salt cannot be dissolved in oil. Under these circumstances, a solution is prepared with the antiseptic liquid mentioned above, and is thickened by the addition of gum Arabic until the fluid is so viscid that "it would cling in a fair round drop on a small lacrymal probe." The effect can be obtained by making the mucilage about eight times the normal strength. SYDNEY STEPHENSON.

(5) The note by **Darier**, of Paris, is really a review of McDonagh's articles in the *Lancet* (13th and 20th May, 1916), entitled : "Links in a Chain of Research on Syphilis."

(6) This article is apparently either a transcription or an abridged edition of **Delorme's** article in *Archives d'Ophtalmologie* for April, 1916. There is nothing to show by whom it is written. The original article in the above-mentioned periodical was duly abstracted in our columns (July, 1916, p. 386).

(7) **Hirsch** reports on the use of embarin, subcutaneously injected, as the most satisfactory treatment for this condition. If begun promptly on the first signs of sympathetic involvement of the sound eye it is capable of preventing destruction in a large proportion of cases. Embarin is a mercurial compound suitable for hypodermic administration.

XI.—MISCELLANEOUS.

(1) **Emerson, Linn.—Business and office methods in special practice.** *Transactions Colo. Ophth. Congress*, July, 1915, and *Annals of Ophthalmology*, Vol. XXV, No. 1, January, 1916.

(2) **Reilly, Thomas F.—The signs and symptoms of impending death.** *Medical Press and Circular*, July 5th, 1916.

(1) **Linn Emerson**, of Orange, New Jersey, contributes an interesting and practical article on the introduction of business and office methods into special practice.

The average income of the physicians of the United States is said to be less than one thousand dollars per year. Emerson, however, estimates that probably not more than five and twenty per cent. are fitted to practise the healing art, and expresses the hope that the higher standards now in force will result in fewer doctors, greater efficiency, and larger incomes.

He laments the absence of all attempt on the part of most medical men, either to systematize their practice, or to bring ordinary business methods to their assistance. He says that the average graduate in medicine has no idea either of business methods or of office routine; he begins wrong, his business methods do not improve as his practice increases, and his affairs consequently pass into a state of chronic disorder, bad for his temper, his nerves, and his health.

The writer then sets forth the methods which he has adopted as a result of fifteen years' experience. The whole tone of the article is fair, kindly, and honourable, whilst at no time does it lose the practical touch. It is an admirable refutation of the widely prevalent belief among medical men that the introduction of business methods into their work opens the door wide for the entry of a spirit of commercialism. The paper is studded with gems of advice, amongst the most delightful of which is that on the management of a fractious waiting patient by a tactful nurse. Two things must be most carefully avoided: first, any appearance of hurry; and, secondly, any failure to give the patient a full and careful examination. An obvious point made by Emerson is that the employment of a cycloplegic on Saturday or Sunday (he works Sundays) often spares a patient loss of time from business.

The spirit of the paper is shown in the brief concluding sentences, "Make no promises; be honest; never worry; do your best—angels can do no better." R. H. ELLIOT.

(2) As a sign of impending death, **Reilly,** of New York, writes as follows regarding the eye: "In any very sick patient whose pupillary reflexes were previously normal, and in whom there is now no reaction of the pupil to light, death is at hand. To this general statement there are some exceptions, namely, in the spinal myosis of the aged, syphilis or its sequelæ, brain diseases, optic atrophy, fainting, and hæmorrhage. A sluggish reaction under the same circumstances is serious, but not necessarily fatal. A dilated pupil under the same circumstances, not reacting to light, means that death is at the door. In most diseases, just before death, the pupil dilates widely. Tennyson states this well when he says, 'As unto dying eyes the hollow casement slowly grows a glimmering square,' meaning thereby that the dilated pupil is unable to distinguish sharply the window panes.

"A glazed pupil usually means that death is at hand. The presence of a film over the eye is always a fatal sign. The death stare or fixed eye is probably due to the dilated non-reactive pupil, although sometimes, if the patient's attention is directed to it, he can actually count the fingers of the hand. It is a fatal sign. Tight closing of the eyes with a firm and rapid pulse, excepting in hysteria, is said to be a sign of an impending fatal issue. When the eyes are half-open during sleep, the patient is not necessarily *in extremis*, but it is a sign of much gravity, especially if it is not due to prostration from diarrhœa. Passive congestion of the conjunctival vessels in a child means approaching death. A tendency of the eyes to turn out occasionally presages death within a few hours." SYDNEY STEPHENSON.

BOOK NOTICES.

The Twenty-sixth Annual Report of the Eye, Ear, Nose, and Throat Hospital, New Orleans, La. 1915.

This Report gives the details customary in such official publications. We need merely note that during the year it covers, 3,179 patients were treated in the eye department, while 291 operations were performed. Many of the patients operated on for cataract were treated as "ambulants."

This has been found to be in their best interests. For example, there has been a notable absence of post-operative insanity amongst them. A word of praise should be bestowed, finally, upon the care with which the somewhat elaborate statistics have been complied. SYDNEY STEPHENSON.

Annual Report and Statistics of the Government Ophthalmic Hospital Madras, for the year 1915. Madras: Printed by the Superintendent, Government Press, 1916. Price, 1 rupee, 6 annas (2 shillings.)

Included in this official document is the report for the year 1915 of the medical superintendent of the Government Ophthalmic Hospital, Major H. Kirkpatrick, I.M.S. It is of interest if only because it shows that the most scientific methods are by no means neglected, even in this distant corner of the great British Empire. It might, indeed, fitly serve as a model for some institutions much nearer home. It amply proves that the great traditions left by E. F. Drake-Brockman and R. H. Elliot have by no means been abandoned by the present incumbent of the office.

During 1915, 2,593 patients were treated in the wards of the hospital, and 16,654 in the out-patient department The operations on in-patients numbered 1,867 and on out-patients, 1,201. There were 1,109 operations for senile cataract. Until the end of May, 1915, the routine operation for senile cataract was by capsulotomy and extraction with irrigation, but then expression within the capsule was substituted. Success (*i.e.*, V. = 6/36 or better) was obtained in 87.5 per cent. of the former and in 83.3 per cent. of the latter. Failure (*i.e.*, V. = inability to count fingers at 2 metres) occurred in 3.2 per cent. of the first and in 9.5 per cent. of the second series. The chief causes of failure in the expression operation included irido-cyclitis following impaction of the hyaloid and vitreous subsequent to operation (21), and suppurative panophthalmitis, due (as it was ascertained) to the elbow of the pressure hook touching the lower eyelid (3).

Corneo-scleral trephining (Elliot) was performed 141 times, and the results, both immediate and as witnessed in patients trephined in previous years, were such as to support the view that it is the best operation for most glaucomatous and staphylomatous conditions. A successful case in a baby of five months with buphthalmos and keratoglobus is mentioned.

Excision of the lacrymal sac, carried out in 131 instances, was found to be so satisfactory that no intra-nasal operation was substituted.

It appears that consanguineous marriages are common in the Presidency. Thus, of 434 men taken haphazard, no fewer than 60.3 per cent. were the children of first cousins, while in a further 3.7 per cent. consanguineous marriages were the custom of the family. This bears upon a form of optic atrophy frequent in the Presidency. Among 50 such patients one alone was free from a suggestion of in-breeding. Most of the patients were males, but, then, the male out-patients are nearly twice as numerous as the females in the Madras institution. A similar point is raised in reference to retinitis pigmentosa (39 patients). of which 71.7 per cent. occurred in the offspring of first cousins and 12.8 per cent. in members of families which made a custom of consangineous marriages.

Subconjunctival injections are highly spoken of in the treatment of uveal affections. Good results have been obtained in keratomalacia by the use of ammonium chloride and calcium chloride, together with inunctions of cod liver oil Kirkpatrick employs gonococcal vaccines with success in catarrhal cyclitis, irido-cyclitis, and interstitial keratitis, besides putting them to their more commonplace uses. SYDNEY STEPHENSON.

An Optical Primer, by CHAS. H. PIXLEY, Chicago: F. A. Hardy & Co., 10, S. Wabash Avenue, Chicago, 1916.

This book is of such uneven merit as to remind one strongly of Jeremiah's figs, of which the good were very good, and the evil were very evil. It is only right to say in advance that it has been written by a layman, and largely for laymen. Herein lie both its strength and its weakness. It gathers within a single cover an amount of information on certain subjects, which we do not ever remember to have seen so collected before. When it deals with the optical and with the practical mechanical side of many subjects, which are of interest to the ophthalmic surgeon, the touch is bold and firm, and the reader feels he is learning from a master and an expert, as indeed he is. Many subjects, which the writers on books on refraction leave severely alone, and wisely so, for they are seldom competent to deal with them properly, are here handled not only ably, but also clearly and gracefully. As surgeons, we are apt to neglect that side of our work, which necessarily falls to the optician to carry out. We are right not to trespass on ground on which we are amateurs, whilst the optician is there an expert; but the more we understand of his difficulties, and of the best methods of overcoming them, the more harmoniously we shall work with him, and the greater benefit will accrue to our patients. There must be very few surgeons indeed who will not greatly increase their store of practical and useful knowledge by studying Mr. Pixley's book. The articles on periscopic and toric lenses, on the choice of lenses for a trial case, on the neutralisation and transposition of lenses, on kryptoks, on the fitting of frames, on the choice of materials for frames, on the phoro-optometer, and on many other subjects are each and all worthy of careful perusal.

There is unfortunately quite another side to the book, which we must discuss. It is not all the result of one pen, and the overlapping and repetition is usually marked and very irritating. So bad is it, that at times it almost looks as if the articles were deliberately written in competition with each other. A good deal remains to be done to eliminate errors in proof reading. The word "cosmic" is constantly and wrongly used, where it is evident "cosmetic" is intended. The worst feature, however, is the attempt of a layman to write on the clinical side of the refraction question. When he does so he flounders pitifully. It may be said in extenuation that the book is written for lay refractionists, and not for ophthalmic surgeons, and that the latter should not criticise it. The plain answer is that in writing such a work for lay refractionists, it is increasingly imperative that the clinical statements made should be most carefully scrutinized, as these men will find it more difficult than the medical man to correct errors so learnt. Were the whole book written on the same plane, there would be no course but to ignore it. It is because it is in some ways so excellent, and in others so bad, that the reviewer would like to see it re-written, and all that is best in it preserved. One of two things should be done. Either the clinical material should be dropped from it, and the excellent optical and mechanical parts of it should be revised and rewritten by a single hand, that of Mr. Pixley for choice, the repetitions being eliminated; or a competent surgeon should be co-opted to scrutinize the clinical portions of the book and see that they are freed from error. The latter could easily be effected in a land like America, which abounds in able and highly expert refractionists.

R. H. ELLIOT.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

To the Editor of THE OPHTHALMOSCOPE.

THE ANATOMICAL RELATIONS OF THE HYPOPHYSIS AND THE CHIASMA.

SIR,

In Mr. J. H. Fisher's interesting paper on the cause of Leber's disease the anatomical relationship of the chiasma to the structures beneath it is discussed This is an important though much neglected subject. The usual description is that the chiasma lies upon the optic groove of the sphenoid and this statement is found in almost all books on anatomy or ophthalmology, if the subject is mentioned at all, although Lawrence pointed out in 1896, and his observations were confirmed by Fawcett, that the chiasma never lies upon the optic groove. Zander showed in the same year that the chiasma lies above and behind the sella Turcica, its posterior edge lying above and on an average 1.58 mm. *behind* the dorsum sellæ and only exceptionally in front of this point. He considers that the hypophysis must rise 5 mm. before it can interfere with the chiasma. Hirsch corroborates Zander and goes even further, holding that the hypophysis must rise over 7.5 mm. before it can touch, much less compress, the chiasma. The few observations, owing to scarcity of material, which I have been able to make give an average vertical distance between chiasma and diaphragma sellæ of 4 mm. This is in the fresh cadaver and would probably be greater during life.

The section from Braune's atlas (Plate 1) which illustrates Mr. Fisher's paper seems a rather unfortunate selection, as the conditions shown are by no means typical. There is no sphenoidal cell beneath the sella. The infundibulum is represented as short, thick, and vertical instead of long, thin, and arching forwards and downwards along the anterior surface of the dorsum sellæ, while it should enter the diaphragma near its posterior edge instead of at its centre. The chiasma is unusually far forwards, its posterior edge being in front of, instead of behind, the dorsum sellæ. The second plate in Braune's atlas shows a much more typical condition, and the illustration given by Hirsch, from a section by Hochstetter, is an excellent example and shows the various points well. As a rule, the relationship will be found to be such that the anterior half or two-thirds of the chiasma lies over the posterior half or two-thirds of the sella, so that a third to a half of the upper surface of the diaphragma can be seen from above in the angle between the optic nerves. It seems surprising that no mention is made of the writings of these authors by Mr. Fisher. The cases quoted occurred in children of 11½ and 14 years. According to Symington's "Anatomy of the Child" the chiasma lies still higher and further back at this age, quite out of reach of anything but a considerable enlargement of the hypophysis.

Several other questions arise in connection with this subject, such as the relation of swelling of the optic disc to chiasmal disturbances due to hypophyseal enlargements, and the kind of field change which occurs in connection with slight enlargement of the pituitary. It is, however, of

Robert W Doyne

prime importance that the anatomical facts should be clearly and exactly established, and anything like "immediate contiguity" of the pituitary body and the chiasma must be very exceptional, if it occurs at all.

Yours truly,

H. M. TRAQUAIR.

EDINBURGH.

P.S.—Cope (*Brit. Journ. Surg.*, July, 1916) states that the chiasma lies 1 *cm.* above the diaphragma sellæ and that a hypophyseal tumour would have to protrude well out of the fossa in order to exert any pressure or traction on the optic chiasma. H.M.T.

NOTES AND ECHOES.

ROBERT WALTER DOYNE, M.A. (OXON.), F.R.C.S. (ENG.), 1857-1916.

Deaths.

WITH the deepest regret (in which our readers will all doubtless share) we announce the death of Robert W. Doyne, which took place at Oxford on August 30th, at the age of fifty-nine years. Mr. Doyne, whose health had been failing for some few years, retired from practice in 1913. His condition had been precarious since last Christmas.

He was the second son of the Rev. P. W. Doyne, vicar of Barrow Gurney, Somerset, and afterwards of Eckington, Torquay, and was born at Monart, Co. Wexford, on May 15th, 1857. He was educated at Marlborough, Keble College, Oxford, the Bristol Medical School, and St. George's Hospital, London. He soon entered the medical service of the Navy and was surgeon on H.M.S. Temeraire, but after marriage in 1885, settled in Oxford, and devoted himself to ophthalmology. At that time there was neither ophthalmic surgeon or *clinique* in the City. Even at the County Hospital there was no dark room, no test-types, and no special appliances. After many difficulties and strenuous opposition, Doyne founded (with the help of influential friends, including Lord Jersey, Bishop Talbot, Dean Liddell, Sir Henry Acland, the Bishop of Oxford, Mr. F. M. Ogilvie, and many others) the Oxford Eye Hospital, at first situated in Jericho, afterwards in Wellington Square, and eventually in Walton Street, where it occupies what was once a fever block attached to the Radcliffe Infirmary. In 1902 Doyne was appointed the first Reader in Ophthalmology in the University of Oxford, a post instituted by the munificence of Mrs. Margaret Ogilvie. Mr. Doyne continued to hold the appointment, with which is conjoined that of senior surgeon to the Oxford Eye Hospital, until his health broke down three years ago. He was also consulting ophthalmic surgeon to the Radcliffe Infirmary, surgeon to the Royal Eye Hospital, London, and held besides a number of minor appointments.

Doyne was essentially a man of ideas, many of which he translated into action. He was many-sided, and possessed great personal charm and force of character. For many years he had a large practice, first in Oxford and afterwards in London, and he enjoyed to a very unusual extent the confidence and love of his patients.

He was a most acute and accurate clinical observer. His name is associated with several conditions, as, for example, a congenital variety of cataract, known as "Doyne's" or "Discoid Cataract," a peculiar kind of degeneration of the choroid, called "Doyne's" or "Family Choroiditis," a form of inflammation of the iris, "Guttate" or "Doyne's Iritis," and of conjunctivo-blepharitis, "Doyne's conjunctivitis." He was the first to describe, in this country, at any rate, the condition of "pseudo-cataract" (so-called "lens with double focus"), and to point out that the sight of those affected with retinitis pigmentosa might be sometimes considerably improved by the operation of removing the crystalline lens. His mechanical bent was shown by the invention of several ingenious appliances. Doyne was the author of "The more Common Diseases of the Eye" (H. K. Lewis, 1896), and contributed many articles to the columns of THE OPHTHALMOSCOPE, more especially in the earlier years of its publication. Nothing can show the original nature of Doyne's mind better than his last contribution to our pages, "The Eye in Sport" (1915), which he had always intended to publish in book form.

Doyne's claims to distinction were indeed many. For many years he conducted at Oxford long vacation courses in ophthalmology for practitioners. He was mainly instrumental in inducing the University of Oxford officially to recognise eye work by instituting a Diploma in Ophthalmology (1910), and he has hinted at some of the tribulations through which he passed in the process in our columns of September, 1915. Doyne presided over the Section of Ophthalmology at the annual meeting of the British Medical Association held at Oxford in 1904. The Section was lodged and met in Keble College, and proved so successful that Doyne inaugurated a series of annual meetings of his ophthalmic brethren, British and Continental, at the same College. These quite informal gatherings were largely attended and very successful, and in 1910 they were recognized as the Oxford Ophthalmological Congress, of which Doyne was appointed first Master.

The salient points of Doyne's character may be summed up by saying that he was the very embodiment of honesty, generosity, modesty, fearlessness, and originality. He was rather quick perhaps to take offence, but equally quick to forgive. To know him was to love him.

Mr. Doyne's endurance during a long and trying illness was remarkable. One instance will not readily be forgotten by those who were privileged to witness it. As recently as July, 1915, at a time when his physical condition was woeful, with his face paralysed and blind of one eye, he had the pluck (it is a mild word) to preside at the annual dinner of the Ophthalmological Congress held in Keble Hall.

Mr. Doyne married Gertrude Irene Hope, youngest daughter of the late John Hollings, of Frimley and Wheatley. Of his two sons, one, Mr. P. G. Doyne, F.R.C S, who is now serving with the Forces, recently occupied the post of ophthalmic house surgeon to St. Thomas's Hospital, London.

Farewell, old friend. SYDNEY STEPHENSON.

A well-known Liverpool ophthalmic surgeon, in the person of Mr. Karl A. Grossmann, passed away from angina pectoris on August 24th, at the age of 65 years. He settled in this country some thirty-five years ago. At that time he held the degree of M.D. Freiburg i.B., and he afterwards (1889 took the Fellowship of the Royal College of Surgeons of Edinburgh. He was appointed the first ophthalmic surgeon of the Stanley Hospital at Liverpool. His was a prominent figure at the meetings of the Liverpool Medical Institution, and at one time he was vice-president of that medical society. Grossmann took an active interest in the British Medical Association, and held important offices in that body. He wrote widely upon ophthalmic subjects, more especially upon colour blindness, leprous diseases of the eye, and the mechanism of accommodation. He was one of the founders of the *Ophthalmic Review*, and for some time edited that periodical in conjunction with Mr. Priestley Smith. Grossmann was a highly accomplished man, being a good musician, draughtsman, and linguist.

As already announced in our columns, Lyman Ware, the well-known Chicago ophthalmic surgeon, died on June 1st, at the age of 75 years. He had practised ophthalmology for upwards of forty-five years. He was one of the founders of the Chicago Ophthalmological Society, and filled the offices of vice-president (1889) and president (1899). From 1871 to 1889 he was attached to the Illinois Charitable Eye and Ear Infirmary. Ware translated into English (1885) F. Arlt's famous "Clinical Studies of Diseases of the Eye." A speaking portrait of our late colleague was published in the August issue of the *Ophthalmic Record*.

Albert Fränkel, the discoverer of the pneumococcus, died in Berlin on July 6th, at the age of 68 years.

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Appointment.

MR. S. L. BUATIA has been appointed ophthalmic house surgeon to St. Thomas's Hospital, London.

* * * *

A Canadian Special Hospital.

AMONG the special hospitals established by the Canadian Army Medical Corps in this country is the West Cliff Eye and Ear Hospital at Folkestone, opened in December, 1915. It has 200 beds, and is used exclusively for patients with diseases or injuries of the eye, ear, nose, or throat. The building, formerly the West Cliff Hotel, lends itself well to hospital purposes. It has been fitted up most liberally with the necessary appliances, including a laboratory and a library. Lieut.-Colonel J. D. Courtenay is the officer commanding, and Lieut.-Colonel S. Hanford McKee, C.M.G., is the second in command.

* * * *

Bequests.

THE Royal Westminster Ophthalmic Hospital has received a grant of £400 from the trustees of the Zunz Bequest.

Mr. Leopold Salomons (who purchased Box Hill and dedicated it to the nation when in danger of being built upon some few years ago) has left one-fourth of the residue of his estate (£287,843) to blind asylums and ophthalmic hospitals and institutions established solely for the treatment of the eye in the City of London and counties of London and Surrey.

Under the will of Miss Mary Hamilton, of Kelvinside, Glasgow, and Ascog, Bute, the Glasgow Ophthalmic Institution (the ophthalmic department of the Royal Infirmary) benefits to the amount of £7,000, while the Glasgow Eye Infirmary receives £1,000.

Dr. John T. Leon, of Southsea, has bequeathed £300 to the Eye and Ear Infirmary, Portsmouth.

Major Henry Ernest Baskerville Walton, of Brighton, has left £500 to the British Ophthalmic Hospital at Jerusalem.

* * * *

Injuries from broken spectacle glass.

INJURY of the eye from broken spectacle lenses opens up important questions from the standpoint both of patient and of oculist. It is usually thought that such accidents are of great rarity. Cases have, however, been published of late years by Hans Lauber, Stephenson, Casey A. Wood, and others, and we are learning that such accidents are perhaps not so uncommon as has been taught. The most recent writer, Dr. F. B. Vreeland, made a communication on the subject to the Chicago Ophthalmological Society on March 20th last. He reaches some interesting conclusions. For example, that *serious* injuries from broken lenses were very rare; that rimless spectacles were less safe than other styles of glasses; that *minus* lenses were more dangerous than *plus* ones; that the injury results quite often from domestic or athletic accidents, and not by any means always from industrial pursuits, as assumed by some surgeons. In the discussion that followed the reading of Vreeland's paper, cases of spectacle injury were mentioned by W. O. Nance, Worthington, Beard, and F. W. Bailey. The last-named, indeed, during the last few years, had had no fewer than four cases of injury to the eyeball from broken spectacle lenses.

* * *

Modern Therapeutics.

AN article by Dr. A. D. Blackader, professor of therapeutics in McGill University, published in the August number of the *Canada Lancet*, is worthy the attention of every medical practitioner. Dr. Blackader insists upon the decreasing value of treatment by drugs, and the greater importance now attached to fresh air, rest, careful dietary, rational hydrotherapy, and pyschotherapy. In general, the result obtained from vaccines and serums is characterised as most unsatisfactory. He strongly disapproves the employment by medical men of the proprietary prescriptions of the manufacturing chemist, as he does that of remedies, the composition of which is hidden or obscure. He is extremely outspoken with regard to synthetic drugs introduced by German manufacturing houses. The great majority of these drugs, especially the more recent ones, are worthless. Some have been appropriated from England and France, and the name having been changed, the profession is called upon to pay the piper for the newly-coined title. He instances the well-known case of hexamethylene-tetramine synthetically produced and proved to be valuable clinically under the name "formine" by M. Albert Robin at the Academy of Medicine in Paris. Some ten years later, the same drug, now called "urotropine," with German patents, was introduced to the profession, and received without question, at five times the price for which it could be made in an ordinary chemical laboratory. At the present juncture we are well able to appreciate how completely Germany has made herself mistress of the situation. The German houses bought up or ruined by underselling all the British or French industries that stood between them and success. Dr. Blackader concludes by making a patriotic appeal to all physicians to prescribe home-made products only. It admits of little doubt that when the war is over, Germany will again make the attempt to ruin the laboratories that are now supplying us with the synthetic drugs of which we stand most in need.

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The Manhattan Eye Hospital.

A HOME for the nurses of the Manhattan Eye, Ear, and Throat Hospital, New York, is to be erected close to the present hospital building at an estimated cost of $300,000.

* * * *

An Interesting Exhibition.

AN exhibition of laboratory and optical glass (all of which formerly came from Germany) has been opened at the Institute of Chemistry, 30, Russell Square, W.C. Much of the glass ware shown has been prepared from formulæ drawn up by the Institute. No fewer than thirty-one such formulæ have been devised by Professor Herbert Jackson and Dr. Merton, acting on behalf of the Institute. Most of these are in actual use. Acting for the Ministry of Munitions, Professor Jackson, in conjunction with a committee of the Institute of Chemistry, has undertaken an enquiry as to the clay used in making the pots needed in the manufacture of chemical and optical glass.

* * * *

Bowman Lecture.

THE Bowman Lecture will be delivered by Sir George Berry at the meeting of the Ophthalmological Society of the United Kingdom on May 3rd, 1917. The subject will be "Colour Vision."

THE OPHTHALMOSCOPE DIARY.

	1916.	
Section of Ophthalmology, Royal Society of Medicine.	November 1st.	1, Wimpole Street, London, W.
American Academy of Ophthalmology and Oto-Laryngology.	Dec. 11th, 12th, and 13th, 1916	Memphis, Tenn.
	1917.	
Section of Ophthalmology, Royal Society of Medicine.	February 7th.	1, Wimpole Street, London, W.
Ophthalmological Society U.K.	May 3rd, 4th, and 5th.	London.
Section of Ophthalmology, Royal Society of Medicine.	June 13th.	1, Wimpole Street, London, W.

THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

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AN ADDRESS ON OPHTHALMOLOGY AND MEDICINE *

BY

Sir Anderson Critchett, Bart., C.V.O.,

LONDON, ENGLAND.

I HAD reached the closing days of 1915, a year which had been full to the brim with anxieties, differing in degree and in intensity, but yet ever-present anxieties for one and all, and at the moment I felt fairly happy, for, like the little victims in Gray's well-known poem, I was "unconscious of my doom." From this beatific condition I was to have a rude awakening, and I might almost have repeated Cæsar's "*Et tu Brute*," for the blow which I received was delivered by a valued friend, none other than he who so ably presided over last year's Congress, whose illness we deeply deplore, and whose restoration to health we earnestly desire. It took the form of a request which placed me in the unenviable and responsible position which I occupy to-day. I did my best to escape, and during my futile struggles I made an original optical discovery which I generously present to you. We are often called upon in the cases of sportsmen and of soldiers to determine which is the Master Eye, and I found that a marked difference existed between the Master Eye and the Eye of the Master, for it was to the hypnotic influence of the latter that I finally succumbed. One terrible fact burnt itself into my brain. I was to follow Sir William Osler, and as I knew only too well that this master of his art would prepare for your edification a perfect piece of medical mosaic, while I should have nothing to offer but some of those good intentions which help to form the pavement of an unmentionable locality, I ardently wished that in this instance, at any rate, it could be a case of "no followers allowed!" I have not had the mingled pleasure and privilege of listening to Sir William's paper, but, in the phraseology of the police, from information received, I believe that he has chiefly dealt with his subject from a clinical point of view, and I feel sure that the far reaching tentacles of his octopus-like mental grasp have included practically everything which is of interest and value in that direction. I venture to hope, therefore, that a certain measure of freedom may be granted to me to deal to some extent with our subject in association with certain former and present types of medical practitioners, as well as from the standpoint of abstract science. A barrister pleading recently before a witty judge, begged that he might be accorded some latitude, and the disconcerting answer came from the bench that it was rather the longitude to which objection might be taken, so I will endeavour not to sin in that direction.

And now, in the words of Thomas Hood, "to cast a glance behind." The poet Crabbe writing of the medical practitioner of his period, did not hesitate to affirm, and even to print, his conviction that his most tender mercy was neglect. Possibly he may have been the victim of too free blood letting, or of too many doses of black draught, the latter being so accurately described by Ingoldsby as:

> "That nasty green fluid they so often send us,
> Labelled *haustus catharticus mane sumendus*."

Crabbe's emphatically expressed opinion reminds me of a characteristic incident in the professional life of that great and far-seeing physician Sir William Gull. He once in consultation diagnosed a pericarditis which had been overlooked by the old family doctor. The latter pleaded in extenuation his increasing infirmity of deafness, and declared that he should never forgive himself for his failure to detect the cardiac trouble. Sir William, placing his hand gently on his shoulder, said "Don't let this distress you, old friend—perhaps it is all for the best. You might have treated it."

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* [illegible]

I will refrain from taking you too far back into the medical dark ages, when ignorance, superstition, and empiricism were in close alliance. It will suffice for our purpose to recall the time when Moorfields Hospital had recently been established, and when the science of ophthalmology, although still in its infancy, was beginning to assert itself. In those days, and for some years after, the ignorance of the medical profession generally respecting diseases of the eye and their treatment, was, to borrow an expression from our American cousins, "pyramidal." It would have given cause for surprise had this not been the case, for there were practically no facilities for acquiring knowledge of the special subject. The short curriculum of three years barely sufficed for the acquisition of a sufficient amount of anatomy, physiology, medicine, and surgery to satisfy the examiners. There were no ophthalmic departments at general hospitals, and, if after obtaining his diploma, a practitioner wished to know something of ophthalmology, he could only gain that information by entering as a student at Moorfields, or at some other special hospital. This entire ignorance of our science was sometimes frankly and quaintly confessed, and a general practitioner of about that period once expressed an earnest hope that my father did not propose to rely on him for assistance, because, in the first place, he had no idea as to what was the matter with the patient, and, secondly, in the event of any operative treatment he would be too nervous to take any part in it. On another occasion, when my parent went a little way into the country to perform an operation for cataract, the family doctor told him, as they drove from the station, that he believed he had anticipated his wishes by exhibiting mercury to the point of salivation.

The change from these conditions came slowly but surely. The period of medical study was extended first to four, and later on to five, years. Special ophthalmic departments were created at all the large Metropolitan hospitals, and at many hospitals in the provinces. Candidates for diplomas found that questions on diseases of the eye were frequently put both in examination papers and *vivâ voce*, and their attention was thus drawn to the necessity which existed for a sufficient knowledge of this important subject. My friend, the late Sir Henry Swanzy, with the aid of other well-known Irish ophthalmic surgeons, induced the examining bodies on the other side of the St. George's Channel to make it compulsory for all students to attend a course of lectures or demonstrations on the eye, and I hope that the time is not far distant when this excellent example will be universally followed In saying this I think I may claim that I am speaking unselfishly and for the public weal, although possibly in opposition to the personal interests of senior consultants. During my twenty years period of office at St. Mary's Hospital, I instructed forty house surgeons and more than twice that number of clinical assistants, many of whom adopted ophthalmology as their life's work, and who have since been occupied, with a considerable measure of success, in taking the bread and butter out of their former teacher's mouth! Many of my colleagues amongst the seniors have had a similar experience, with the result that there is now hardly a town of, say, ten thousand inhabitants in the United Kingdom which cannot boast the possession of a competent ophthalmic surgeon. This is, undoubtedly, a boon to the community, and we also realize with satisfaction that with the great body of the profession,

" the old order changeth, yielding place to new," so that serious mistakes in the diagnosis and treatment of eye troubles are now of infrequent occurrence.

If we could secure the certain and early recognition of cases of glaucoma, we should feel that there was little more to be desired, but there is still something to be achieved in that direction. In opening a discussion on glaucoma, at the meeting of the British Medical Association at Brighton, in 1886, Sir Jonathan Hutchinson said that he had often been tempted to have the appearance and symptoms of the disease printed in large type, in red ink, once in every year on a whole page of the various medical journals. Amongst many instances of mistaken diagnosis to which he referred was that of an old medical practitioner who called him in too late to a case of acute glaucoma, and who explained that he did not summon him sooner, because he felt sure that he would not venture on any operative measures while the eye was so inflamed. Sir Jonathan said he had not the heart to tell him that this very condition would have prompted him to operate without any delay. It is of course specially unfortunate when the disease is thought to be iritis and treated with a mydriatic.

We are often brought into association with cases of ophthalmia neonatorum, and here again both the specialist and the medical practitioner have cause for congratulation on the excellent results which have followed the recognition of the serious possibilities which may ensue from failure to treat these cases with prompt efficiency. The struggle against official inertia and opposition has been long and arduous, and the victory won by British ophthalmology on behalf of the helpless infants deserves to be placed on permanent record. More than thirty years ago Sir William Bowman and Mr. Jonathan Hutchinson headed a deputation to the Local Government Board, and in the fifth volume of the *Transactions* of the Ophthalmological Society we read, that in a short but earnest and impressive speech, Sir William pointed out that this disease, if taken in time, was almost invariably curable ; whereas when left to run its course, it led, in a large number of cases, to complete and irremediable loss of sight, and that fully thirty per cent. of the cases of blindness in the United Kingdom were due to this cause. Mr. Hutchinson followed with the practical suggestion that with each order issued by the relieving officer for medical attendance in childbirth, there should be given a printed slip containing the following words: "If the child's lids become red and begin to run with matter within a few days after birth, it is to be taken without a day's delay to a doctor. The disease is very dangerous, and, if not at once treated, may destroy the sight of both eyes." In spite of these eloquent and practical appeals from those two eminent and experienced ophthalmic surgeons, the Registrar General, who was present, said he could not see his way to advising that the suggestions of the Society, so far as his department was concerned, should be carried out, and the final record of the proceedings was to the effect that no further steps were taken by the Local Government Board. I yield to no one in the admiration which I have always felt for these two great men ; but I must frankly own that they were not ideal ambassadors on such a mission as this, for Sir William Bowman was a gentle courteous scientist, and Mr. Hutchinson was a pacific Quaker. It is, I think, a matter for regret that they were not accompanied by some more combative and iconoclastic colleague, for I feel well assured that the firm threat of a direct appeal to the tribunal of public opinion, through the medium of the lay press, would have rapidly brought ignorant and obstructive officialism to a more reasonable frame of mind.

Undaunted by our official rebuff, we before long returned to the attack, and at the instance of the Ophthalmic Section, over which I had the honour to preside in 1889, the British Medical Association issued special instructions to midwives. Further security has lately been insured by the inclusion of ophthalmia neonatorum amongst the notifiable diseases. I think and hope that in these enlightened days there are few practitioners who fail to recognize the gravity of these cases, and the need for prompt and possibly vigorous treatment. I remember, however, that soon after my appointment to St. Mary's Hospital, a doctor who practised in the neighbourhood deprecated the bringing of a tiny patient to me, although one eye was hopelessly lost, and the other in a parlous condition, on the ground that I could do no more for the child than he could, and his treatment had been limited to the infrequent use of a boric acid lotion. Whether in these circumstances he was placing my capabilities at a high or low level I must leave you to determine.

Here let me give you a practical hint always to seal your letters when writing to medical practitioners, unless they go through the post. On one occasion a doctor sent me a little patient with ophthalmia neonatorum, and at the same time wrote to tell me that before its birth the mother had suffered from leucorrhœa. In my reply, which I confidingly entrusted to the maternal grandmother, I said that probably the discharge to which he had alluded was the *fons et origo mali*. The doctor later on told me that the suspicious old lady steamed my envelope, and of course came upon those mysterious Latin words. She could make nothing of the first and second, but she swooped like a hawk upon the third—the *male*. "There now, I was right after all. What did I tell you, my dear, it's your husband."

During the last few years accuracy in diagnosis and success in treating these cases have been achieved through our knowledge of the bacteriology of the disease, and in many instances when I have been called in consultation, I have been gratified to find that the family doctor had recognised the importance of this element, and had prepared a careful statement of the microscopic revelations. In an able paper recently published by Dr. G. E. de Schweinitz, of Philadelphia, he affirms that the two chief causes of blindness in America are glaucoma and ophthalmia neonatorum.

The firm alliance which must always exist between medicine and ophthalmology was long ago recognised and cemented by the governing body of Moorfields Hospital, for we find that from a very early period in the history of that institution there has been a consulting physician on the staff. And time has only welded more firmly the links which bind us together, so that the ophthalmologist can indeed say to his medical brother what Richelieu said to France: "Who shall proclaim divorce twixt me and thee." I have noticed with satisfaction that during recent years there has been a growing endeavour, both in the Ophthalmological Society and in the Ophthalmic Section of the Royal Society of Medicine, to select subjects for discussion which would attract the presence and the co-operation of other branches of the profession, and during the period when, by the generous suffrage of my colleagues, I held presidential office, I did all that lay in my power to promote such meetings, and to render them successful, for I recognised that the interchange of our mutual experiences could not fail to result advantageously alike to us and to the general public.

The names of the distinguished men who are taking part in the present discussion form a guarantee that the interesting subject will be exhaustively dealt with from divers points of view, and I am not without hope that this may in some measure compensate for my many shortcomings, for with the limited time at my disposal, I can but glance hurriedly at a few instances which illustrate what I have already asserted. It might almost be said that the eye may on occasion show evidence of almost every disease known to medicine, and in many instances the ophthalmic symptoms and the ophthalmoscopic examination sound the first note of warning respecting a serious constitutional condition. No better illustration of this can be taken than a case of Bright's disease, and many of us have had the sad experience to be consulted by an old friend, and even by a colleague, respecting a dimness of sight which was an annoyance and inconvenience, but to which no special importance was attached, and to discover the fatal signs of albuminuric retinitis. We, of course, seek the co-operation of a physician, but we know, only too well, that our joint efforts are scarcely likely to postpone the fatal result for a longer period than three years.

We shall ever remember with pride that the invaluable ophthalmic sign in the diagnosis of locomotor ataxia will always be associated with the honoured name of Argyll Robertson ; and for one of the most useful aids to general medicine we are indebted to the late Marcus Gunn, who was the first to point out that evidence of arterio-sclerosis might be obtained by the employment of the ophthalmoscope. It is unnecessary now to describe the ophthalmoscopic changes undergone by the retinal vessels in this condition, for they are known to every physician. It may be doubted, however, whether the profession yet realizes the fact that the first clue to the existence of arterio-sclerosis and its train of associated symptoms is often furnished by an ophthalmoscopic examination of the fundus oculi. In other words, the condition may be detected at a time when the maximum of good may be done by regulating the patient's diet and mode of life. It would be an excellent thing if every ophthalmic surgeon, on detecting these fundus changes, used his best endeavours to persuade his patient to consult a competent physician without delay. The connection between ophthalmology and medicine is of special importance in affections of the nervous system. The diagnostic value of papillœdema in neurological affections can scarcely be exaggerated, more especially in these days when an early recognition of some of these conditions may lead to successful operation. Many a case of intra-cranial tumour or abscess, or of meningitis, has been diagnosed by the ophthalmoscope. In former days the apprenticeship to that instrument was often tedious and difficult ; but now with the introduction and rapidly extending use of the electric ophthalmoscope, matters have been simplified, particularly as regards the examination of the eyes of patients confined to bed. In the hands of physicians that instrument should render the examination of eyes as much a matter of routine as the use of the stethoscope, or the analysis of urine.

Vast importance attaches to the observation of the late Dr. Hughlings Jackson (one of the greatest pioneers of neurological research), that papillitis may be present with little or no impairment of sight. Time, the great arbiter, must decide on the divergent views of Victor Horsley and Paton as to the localising value of papillœdema. Its presence in association with gunshot or other missile wound of the vault of the skull may supply a most valuable diagnostic sign ; for it has been suggested that whenever found in these cases, no matter how apparently trivial in appearance the wound may be, it implies a fracture of the skull, although the appearances of the original wound did not point in that direction. The reality of the fracture, however, has now been shown in many cases by X-rays or operation.

The diagnostic value of optic atrophy is known to all. Every student is aware of its value in the recognition of such diseases of the central nervous system as tabes dorsalis, general paralysis of the insane, and disseminated sclerosis. Much attention has lately been paid to the affections of the somewhat inaccessible pituitary body, and under the name of "dyspituitarism" Cushing has grouped the various anomalies of secretion, whether on the side of excess or deficit. The early onset of optic atrophy is likely to bring these patients under the notice of the ophthalmic surgeon, and rapidly increasing blindness would form a definite indication for the performance of some surgical operation intended to relieve pressure.

I have briefly, and I fear very imperfectly, dealt with a few of the numerous instances where we are often acting in unison with our medical colleagues. So many others come crowding in upon my memory that "I could prate upon this theme until mine eyelids could no longer wag." But with reluctance I must refrain, for I have other things to say and but scant time left in which to say them.

May I here put in a plea for the infusion of more interest, and for the adoption of a brighter style of writing in the books intended for our students? The little organ with which we have to deal should inspire authors to put forth their best literary wares by the delicacy of its structure, the perfection of its mechanism, and the intense interest which is evolved by the effort to combat its diseases. I can, however, recall text-books—shall I bring down minatory denunciations on my devoted head if I whisper that one or two of them came from the other side of the Atlantic?—whose arid and barren letter-press served rather to repel those whom it should attract, and made one long for "the touch of the vanished hand" of Oliver Wendell Holmes.

I have been tempted to send the authors a copy of the delightful letter which the late John Clayton, the well-known actor manager, once wrote to an aspiring dramatist:

> My dear Sir,
> I have read your play:
> *Oh*, my *dear* Sir!
> Yours truly,
> John Clayton.

Only to a chosen few is given the power to infuse poetry into pathology as we find it in the lectures of Sir James Paget; to invest comparative anatomy with the absorbing interest of a romance as accomplished by Huxley; or to achieve for his work the place of a permanent classic as did John Hilton with his wonderful book on "Rest." I venture to claim, however, that both America and Great Britain now possess many brilliant literary champions amongst the ophthalmologists. If it be not invidious to mention names, I should like to allude in a special manner to two of our own gifted writers: Mr. Brudenell Carter, and Sir John Tweedy. Although the former no longer takes an active part in the practice of his profession, he still retains the wonderful power of lucid expression allied to polished style which made him such a power on both the general and medical press. I chanced to meet him on his eightieth birthday, and he told me that he had celebrated the occasion by writing a leading article for *The Times*. I once said in allusion to Sir John Tweedy that he was a man who clothed original thought in academic language. Those who are acquainted with his contributions to the *Lancet*, and who have had the good fortune to read his lecture on John Hunter, will, I know, be ready to endorse the truth of this assertion.

In the opposite, but not opposing, camp of medicine a wider range of subjects has naturally given scope for many writers of exceptional literary capacity, and we eagerly welcome their work. I can only stay to quote a few names here, but those which come at once to my mind are Lauder Brunton, Goodhart, Osler, Frederick and James Taylor, and Clifford Allbut.

With each and all of these the subtle charm of their literary style bestows upon their writings the attribute of fairy fingers beckoning us on with gentle but irresistible attraction into the Elysian fields of knowledge.

And now a few words on a point concerning which I feel rather strongly. The subjects with which we deal are too serious and responsible to admit of any frivolous element, but there is no reason why in our desire to be duly scientific and professional we should be deadly dull. This should apply to the papers we contribute to the medical journals and societies, and should also guide us in our treatment of patients, for with these latter the cheerful demeanour, which is begotten of legitimate self-confidence, is a potent factor for good. Sir Richard Quain told me that while he was a young resident at a Dublin hospital, a celebrated Irish surgeon asked him to assist him at an operation. The youth thought that he ought to assume a very grave demeanour, and he carried this so far that it attracted the attention of the great man, who, taking him on one side, said: "For Heaven's sake don't look like that, my boy, or they'll be thinking I have brought the undertaker."

Speaking many years ago at an International Ophthalmic Congress, at Heidelberg, I ventured to illustrate one of my points by a reference to the play of Hamlet. It came to my knowledge that a few ultra-strict and stolid Teutons were inclined to resent this as an unjustifiable innovation, and considered that such were *Spielerei* and should be reserved for after-dinner speeches. As however I found that my French and British colleagues not only condoned, but cordially approved, what I had said, my withers were unwrung.

When I had to inflict lectures on the students at St. Mary's Hospital, I always endeavoured, if opportunity offered, to fix important points in their memories by the use of apt illustrations, which, as Gilbert so happily put it:

They might carry to the catacombs of age,
Photographically lined
On the tablets of the mind,
When a yesterday has faded from its page.

And I have since received assurance from many former pupils that they had often realized their practical value when engaged in the work of their profession.

I have always sought to instil into the minds of my students a profound respect for the *vis medicatrix naturæ*, for this is surely our most faithful ally alike in medicine, in surgery, and in ophthalmology: a trusty, long-suffering friend whose efforts have been too often thwarted by the well-intentioned, but unfortunate, co-operation of ignorant empiricism. Sir William Broadbent once instanced as his conception of a weak physician the man who invariably treated symptoms with strong remedies; and I think that I shall be in accord with the views of my senior colleagues when I assert that with extended practical experience comes a tendency to rely chiefly upon gentle and simple measures of relief, and in many instances to stand aside altogether in hopeful and grateful expectancy when we realize that all is going well with the natural process of repair. *Inter alia*, the present war has taught us that any application to wounds which tends to destroy tissue undoubtedly does harm; and my experience at the King George Hospital confirms the view recently expressed by Captain Ormond in his able paper in *The Practitioner*: that with respect to foreign bodies in the eye it is wiser in the majority of cases to follow Lord Melbourne's well-known counsel and "leave them alone."

The principle which I have just been advocating was laid down for me at a very early period of my medical studentship by that great surgeon and most genial of men, Sir William Fergusson, on the occasion of my first introduction to him. Placing his hand upon my shoulder, he said: "My laddie, you are just now entering a great and grand profession. What you have to do is to put that dear old lady, Dame Nature, in the best position for helping you and your patient, and when the kind old thing has done her best for both of you, why then—you may just step in and take the credit!"

Through the bitter trials of the last half hour you have, I am glad to know, had one great consolation. I have heard it said that nervous actors on the first night of a new production are known to comfort each other and themselves with the oft-repeated whispered assurance that eleven o'clock must come; and so you have doubtless been mentally consoling yourselves with the reflection that this paper must have a time limit. I know only too well that I have strained your good nature and your patience almost to breaking point by my vagrant and not too relevant remarks, and I am well aware that had this been the House of Commons the Speaker, after one or two warnings, would have suspended me for the remainder of the sitting, a result which might have brought a large measure of relief to all concerned. I am not altogether free from fear that to-morrow's local journals may contain such a paragraph as the following:—

> Yesterday afternoon the City police arrested a middle-aged man [I trust they will not say elderly], who was found wandering hopelessly from his subject.

And now will you, who have already suffered so severely at my hands, kindly bear with me for yet a few minutes longer, while I venture briefly to introduce a personal element which has only an indirect bearing on what has gone before. I have, however, something that I wish to say, and the opportunities of addressing one's comrades from the heart as well as from the head are, like the plums in the pauper's pudding, few and far between. While I was quite a young man, I called, at his friendly request, to see Sir William Gull, who was at that time recovering from the first of his attacks of serious illness. In telling me of his intention to retire from practice, he said: "For me the professional race is over, but I am still watching you youngsters from afar, you '*nantes in gurgite vasto.*'" And then he added: "What an excellent thing it would be for us and for the public if all the swimmers would agree to banish professional jealousies, and once and for ever to abjure the side stroke." I knew what he meant by this metaphor, and I determined that so far as I, personally, was concerned, the green-eyed monster should exert no influence in the scheme of my professional life. Putting this practically into effect, I did not hesitate to transfer my patients to provincial colleagues, or even to strangers, when they were leaving town, and I felt that they would benefit by further treatment.

When this became known to my London friends they were divided, many of them, in their views respecting me; some being of opinion that I must have had my training at Earlswood, whilst others considered that I was qualifying for Bedlam. Undeterred by their well-meant remonstrances, I steadily pursued my course; and I am glad to say that never, to my knowledge, has my trust been betrayed. I am convinced that I have added materially to my own happiness, and if I were once more at the beginning of my professional career, I would follow the same plan that I adopted. So it is with the confidence begotten of long experience that I now cordially commend this course to my younger colleagues. To each of them I would say, in the words of Shakespeare's wise old minister:

"This above all: to thine own self be true,
And it must follow, as the night the day,
Thou can'st not then be false to any man."

IRIDECTOMY IN GLAUCOMA.

BY

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(*Concluded from p.* 517.)

MOST of the great questions of surgery pass, sooner or later, through a stage of active, or even of violent, controversy. It is thus that the gold of truth is tried in the furnace of conflicting opinion, and the very fierceness of the discussion may well be a factor in the speed with which a decision is obtained. On the vexed question of the value of iridectomy in glaucoma, there are to-day many widely diverse estimates before us, and the contest of views is decidedly fierce; but fortunately throughout the discussions the attitude of all alike has been a whole-hearted desire to get at the truth, whatever the cost may be. This spirit can only lead to good, and the present communication is written with an earnest desire to follow in such worthy footsteps. When the writer first sat down to the task, the difficulties seemed insuperable; for it did not look as if it were humanly possible to draw any trustworthy deductions from the tossing torrent of clinical evidence, represented in the writings of the last two or three years. A careful and protracted survey has shown that to some extent these fears were well founded; it is still too early to hope to attain finality of judgment. In the years to come the river of knowledge will flow broad, strong, and calm, fed by the torrential waters of to-day. We are too near the waterfall to look for an even flow of opinion, but just as some of the great questions which vexed von Graefe and his colleagues are to-day matters of established knowledge with us, their successors, so may we hope to hand down to those who shall follow us, a rich heritage of the reward of faithful and patient labour. If we may not pass sentence, we may at least calmly and dispassionately weigh the evidence, and we should most assuredly strain every nerve to collect data, which shall accumulate, as the years go by, until a time is reached when we, or perhaps others, can reap where we have sown.

In the following pages, then, an effort will be made to draw some broad deductions, which shall be of use to us in our search for truth. Details and statistics will for the present be avoided, as it is thought that any close consideration of them can only help to confuse the issue.

THE RELATIVE VALUE OF IRIDECTOMY AND SCLERECTOMY IN GLAUCOMA.—Here we are met with a maelstrom of conflicting opinions. Some would perform sclerectomy in all cases of the disease; others would select iridectomy as their universal operation; yet others would continue to do iridectomy in acute and sub-acute cases, reserving sclerectomy for the chronic disease. Closely connected with the decision as to the operation to be selected, is that as to the time when the procedure is to be undertaken, for whilst there is a large number of surgeons who would follow the rule laid down by von Graefe, that the earlier operation is undertaken in glaucoma the better; there are still many who, for one reason or another, put off the so-called "evil day" as long as possible. Yet another question is entwined with those now before us, *viz.*, that as to the value of medicinal treatment.

How does the performance of an iridectomy reduce the tension of a glaucomatous eye? It is most important that our answer to this question should be clear and well-defined. There are several distinct ways in which iridectomy may act.—(1) In early cases, before the angle of the chamber is irreparably sealed, the removal of a sufficient piece of iris mechanically opens up the filtering area in the neighbourhood of the base of the excised portion, and thus permits the escape of a sufficient quantity of fluid to maintain the correct balance between secretion and excretion. This point has been worked out by Treacher Collins (Hunterian Lectures, *Lancet*, 1894). (2) Fuchs, in 1896, at the Heidelberg Ophthalmological Congress (*Archives of Ophthalmology*, Vol. XLIII, p. 12), drew attention to the fact that aseptic iris wounds show no tendency to scar formation or healing, but remain indefinitely in the condition immediately produced by the operation. His method of transfixion of the iris in cases of *iris bombé* is claimed to owe its success to this fact, since the small openings made in the iris remain permanently patent, and thus keep the anterior and posterior divisions of the aqueous chamber in free communication with each other. Fuchs' findings were confirmed by Malcolm McBurney. Thomson Henderson has suggested that the traction on the iris made in performing an iridectomy causes minute rents and lacerations throughout its circumference; he thinks that these "traumatic crypts" assist the raw edges of the coloboma in bringing the aqueous to the iris veins. (3) As has been pointed out in the preceding article (THE OPHTHALMOSCOPE, October, 1916), p. 509, both von Graefe and de Wecker had laid stress on the extraordinary frequency with which the performance of an iridectomy was followed by the establishment of a filtering cicatrix. It was the latter writer, however, who first appreciated the deep under-lying significance of this phenomenon. Since his time, the observation has become one of the commonplaces of ophthalmic surgery, and to-day, the great majority of surgeons accept without reservation the view that one, at least, of the ways in which an iridectomy lowers the tension of an eye is by the establishment of a vicarious channel of filtration between the anterior chamber and the sub-conjunctival space. Any operation, which temporarily relieves a glaucomatous condition, and which at the same time either guides or frightens a patient into taking more care of his eye condition, may easily result in the avoidance of fresh congestive attacks of glaucoma. This is largely a question of prophylaxis. It is, however, quite another matter when we come to discuss operations which are essentially curative in their action, and which rely for their success on the re-establishment of a normal balance between the secretion and excretion of fluids in the eye. The important point to grasp is, that if an iridectomy is to be successful by re-opening the normal filtration area in the neighbourhood of the iris base, it is essential that the procedure should be undertaken at an early stage before the approaches to the angle of the chamber have been obliterated and sealed down by plastic exudate. It is useless to tear away the iris after the sinus of the chamber is closed. Moreover, the detachment of the iris no longer takes place along the line of its true and original base, but along that of a new and spurious base, *viz.*, the line of its anterior attachment to the cornea and sclera. When we come to discuss the modern filtering operations, we are dealing with an entirely different set of conditions. We do not aim at opening up old physiological channels, but at forming a new and vicarious conduit for the aqueous. It is admitted that the later the case the worst the prognosis, and that this in part, perhaps in large part, depends on the fact that the advance of the iris, owing to its adhesion to the sclero-cornea, makes the attainment of a uvea-free fistula more difficult and more hazardous; but there can, we think, be no question that a fistula can be established long after the time is past when an iridectomy would be of any avail. There is thus provided a ready explanation on rational grounds for the strong preference which many able surgeons show towards continuing to perform iridectomy in their acute and sub-acute cases. It is suggested that the indication lies not in the acuteness of the attack, but in the fact that such acute attacks commonly occur fairly early in the disease. There is another factor which we must leave for the present, *viz.*, the individual preferences of different surgeons for individual methods. This will be discussed later.

If the views above outlined are accepted as correct, it is obvious that they must have a very important bearing on the much discussed and knotty subject of the correct time to be selected for operation. If iridectomy is our operation of choice, it must be obvious that to lose time over general and meiotic treatment is prejudicial to the best interests of the patient, since by allowing the disease to progress, it lets slip the most favourable opportunity for surgical interference. In the previous article, it was shown that von Graefe, de Wecker and many of their leading *confrères* laid the greatest stress on the importance of operating early, if at all. It may be said that the modern operations are on a different footing, and there is a certain amount of justice in this claim. They are not dependent on the reopening of the normal channels, but on the establishment of new and artificial ones. Nervertheless, it is quite certain that the earlier we perform sclerectomy in a case of glaucoma, the better is our prospect of success. Why then do surgeons hesitate? To this question there are several answers. *Firstly*, there is a certain number of cases on record, which have been watched for many years by competent ophthalmologists, and which during that period have remained *in statu quo* under the influence of a suitable regimen and of the instillation of mild meiotics. Many years ago, de Wecker wrote in bitterness of soul his opinion that if meiotics had never saved an eye, they at least had lost many. Long before he had read de Wecker's dictum, the writer had put forward his opinion that these occasional cases of success under meiotic treatment had encouraged many ophthalmologists to delay operation, and so had caused a loss of sight totally disproportionate to the meagre gains which can be laid to the credit of what has been termed the "expectant treatment." The writer is convinced that if taken in the mass the best results will be found in the clinique of the surgeon who operates the moment that he is satisfied in his own mind that glaucoma is present. This is a broad general statement, which, however, requires some qualification. Cases must be taken individually and not in a mass, and here, as in every other of the great questions of life, the particular circumstances of the individual must be carefully taken account of. Some few factors may be considered, and of these the one which stands out pre-eminent is that of the age of the patient as affecting his probable expectation of life. An old man, with a very slowly progressive simple glaucoma, would require to be carefully watched. He should only be operated on if he is obviously going down hill at a rate disproportionate to the general failure of his powers. Even then it would be necessary to bear carefully in mind the possible dangers of the course on which we are thinking of embarking. Post-operative pneumonia, insanity, and even comparatively sudden death are possibilities which bulk larger and larger as the sun of life dips toward its horizon. In one case, a man in the eighties may be safely operated on without the least fear of the dangers we are discussing, whilst another, still in his seventh decade, may be in such a condition that it would be very unwise to touch him.

The great cause of hesitation in undertaking an operation for glaucoma, on the part of not a few surgeons, is undoubtedly the fear of a bad result. It has been the unfortunate experience of most men in large surgical practice, and probably still more frequently of a great many who operate less often, and have therefore less facility of manipulation, that after the operation, be it what it may, the patient sees less well, and is dissatisfied with the results of the procedure. Sometimes the failure is due to faulty *technique*, and might be avoided; this is probably more often the case than is admitted. There still remain cases, in which in spite of an apparently perfectly carried out procedure, the central vision, or the visual field or both are distinctly worse after than before the surgical interference. It is of course necessary to bear in mind that the full benefit derived from a decompression operation on the eye cannot be judged till six weeks to three months have elapsed. The shallowing of the chamber with the consequent advance of the lens system, and the disturbances of intra-ocular circulation, manifested by choroidal detachments and other phenomena, produce transitory effects which must be given time to disappear, as they usually will do. But, apart from these, there remains a certain number of cases in which the harm done by operation is permanent. This complication was well-known in the days when iridectomy held undisputed sway. In the great majority of cases, it was met with after operating on late cases, and especially on those in which the visual field had contracted until its margins closely approached the centre of vision. It was then found that the relief of tension was followed by a considerable further loss of field, which frequently invaded and washed out central vision. There can be little question that this form of post-operative misfortune is very much rarer with trephining than it is with iridectomy, but it must be admitted that *no* form of operative procedure for glaucoma is quite safe from it in late cases. There is, however, another side to the question. If there is one thing more certain than another in the study of glaucoma, it is that in the vast majority of cases the condition moves forward, inexorably and steadily, to a termination fatal for vision. If sight is lost of this most important fact, the perspective in which the condition is seen is hopelessly wrong. There are *risks* in advancing to surgical intervention, and those risks grow greater as the case progresses; but there is the *certainty* of defeat in the vast majority of cases if the eye is left to fight its own battle aided only by general and medicinal regimen. The number of cases in which glaucoma has been held in check indefinitely by such treatment is limited. On the other hand, we have all of us seen cases in which a hesitation to operate has resulted in the patient losing all, or nearly all, vision. Such instances are common, but an illustration may not be unnecessary. Within a very short period the writer saw two medical men who were suffering from glaucoma, and who had been advised to "take their chance with meiotics." One of them lost all sight of one eye, which was then removed, as it was painful, and he was told to go on with the same treatment for the second eye. The other lost his field extensively in one eye, and down to within 10° of the centre over part of the second. Both were trephined, the remaining eye in the one, both eyes in the other; both of them have continued in busy practice for nearly two years, *i.e.*, to date, and in both the visual acuity, the fields and the tensions show that the condition has been definitely arrested. Many of us could multiply such cases, but they are quoted as a protest against the view that "the dangers of operation should make the surgeon very careful how he resorts to the knife or trephine." Rather would one say, "the dangers of hesitation are so appalling that the surgeon should weigh well his responsibility before he neglects or hesitates to resort to surgical intervention."

There is one great difference from the surgeon's point of view between the two positions above outlined. If he operates and leaves his patient worse, blame, often very unjustly, falls on his shoulders; whereas, if he refrains from interference and the patient loses all sight, the loss is gradual, and the onus of it is placed by the patient and his friends on the disease or on Providence, according to the individual bent of their minds. The lot of the surgeon is a hard one: his critics are often unreasonable and unfair; when he has done his best, and a good best at that, he is open to damage, both material and moral, at the hands of those who should in reality be his grateful adherents; and this, because the only standard most of them can judge him by, is that of results. Who shall presume to blame the man who under such circumstances hesitates to operate on difficult and dangerous cases, or even on those easier earlier cases, before whom he knows stretches out a long moiety of unexpended life, an accident in the course of which may be turned or twisted to the dishonour of the surgeon's work? The public in this are reaping what they sow. Despite it all, the greater man is he who can put such considerations from him and act on the probabilities of the case alone. It does not, we fear, follow that he will be the more successful man in a commercial sense.

In the course of the above argument we have touched on *a third cause of hesitation* in operating, *viz.*, the fear of late infections. The writer has often maintained, and he still believes, that the adoption of a correct *technique* greatly diminishes the risk in question. He has neither denied nor belittled the danger; but seen in contrast with the consequences of a policy of "wait and see," it seems to him to be dwarfed by the comparison.

The *last consideration which induces a hesitancy in operating* for glaucoma, is that of undertaking a new form of procedure. Iridectomy is familiar to us all from our professional infancy onwards; it is taught, or rather it is supposed to be taught (for it can really only be learnt on the living), in operative surgery classes; we have had it dinned into us from our receptive student days onwards, that it is a very easy procedure, which it certainly is not. To make an incision in the eye and to get out a portion of iris is easy enough, but to do a neat iridectomy, and to make it exactly as one wishes to in the particular case is not easy; indeed, in a high tension eye, it is a difficult and hazardous procedure for the best operator. On the other hand, the newer operations are surrounded with the dread of the unknown; the difficulties inherent in them appear to be greater to the unaccustomed operator than have been thought. One thing would seem to be quite certain, and that is that the results obtained have varied widely in the hands of different ophthalmologists. Allowance must undoubtedly be made for the fact that one style of operation may suit one surgeon, and another another. The man who has carried out a procedure in a large number of cases with excellent results will naturally undertake it with confidence, under conditions which would deter another, whose experience has been less happy, whilst a third who has met, be the reason what it may, with an unusual number of disasters, will refuse to touch the method at all. This rule holds right through all departments of surgery, and explains the extraordinary diversity of means used by those who are working for the same end. Each must find out for himself the method that is best suited to his peculiar surroundings, and to his own abilities. What is right for one, may well be wrong for another.

A brief summary of the conclusions reached may be given:—

(1) If an operation for glaucoma is to be undertaken, the earlier it is performed the better is the result likely to be; therefore, it is important to make up one's mind on the subject at the earliest possible moment.

(2) Every case of glaucoma in which operation is postponed should be

watched with the utmost care, and the moment that medical treatment fails to hold it in check, surgery should be resorted to *without delay*.

(3) Special watch should be kept on (a) the condition of the visual field, (b) the tension, and (c) the visual acuity. (The order is deliberate). A departure from the normal in all three, or in any one of them, and especially in the visual field, calls for a decompression operation.

(4) Iridectomy, undertaken with the deliberate intention of freeing the natural channels of excretion, and so of restoring the *status quo ante*, should only be resorted to in those early cases, in which there is reason to believe that such a feat is possible. Once plastic inflammation has blocked the angle of the chamber, this *rôle* of the procedure ceases.

(5) When it is recognised that the attainment of decompression depends on the opening up of vicarious filtration channels, the obvious call is for one of the newer operations. The fact that an iridectomy, or a sclerotomy may be followed by the formation of a filtration scar is beside the point. We should deliberately undertake a well-planned procedure, which aims at the formation of the kind of scar we desire to produce. Any other line of action is bad surgery, since it lacks consistency and clarity of purpose.

(6) Each surgeon must be guided not only by the environment of his patients, but also by his own idiosyncrasies.

(7) Each case must be considered on its own merits. The relative prospects of life and of remaining months or years of sight must be carefully weighed. Against the admitted dangers of operating must be set the inexorable progress, and the appalling results of the disease.

(8) Statistics are wanted both of success and failure. If they are forthcoming, as they will be, those who follow us will know what we guess, will walk where we grope, and will owe us a debt like that which we owe in our turn to von Graefe, de Wecker and the stalwarts of their time.

THE END.

LARGE RECURRENT INTRA-OCULAR HÆMORRHAGES.*

BY

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Introduction.

CASES of recurrent spontaneous intra-ocular hæmorrhages in young healthy subjects are sufficiently frequently met with, and although many suggestions have been made as to the causes and treatment, knowledge on the subject cannot be said to be complete.

I therefore record a few cases, in order to invoke discussion, and to gain the experience of others.

Such occurrences are said to be more frequent in young men, and possibly the menstrual flow in the other sex acts as a safety valve, rendering it less liable to occur. In some cases epistaxis is met with.

Both these points support the idea that venesection may be beneficial as treatment.

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* Presented to the Ophthalmological Society of the United Kingdom on May 6th, 1916.

Alteration in the coagulability of the blood is thought to be responsible. Reports concerning the coagulability cannot always be relied on, since, as pointed out by Professor Milroy, the tests applied require the most careful *technique*, for he found that in one individual when a deep puncture of the skin was made and a rapid flow of blood resulted, the coagulation time was 3¼ minutes; whereas in the same individual, when a slight puncture was made and one drop of blood squeezed out, the coagulation time was only 20 seconds (*British Medical Journal*, Vol. I, 1910, p. 507). I have not found investigation of that property of great service, possibly because it cannot be influenced much clinically by those drugs which in the laboratory can increase or lower it, the reason being that the dosage required is too large to be borne by the system generally. If coagulability is increased, citric acid or some form of citrates are indicated. If, on the other hand, coagulability be reduced, lactic acid or calcium salts, or the two combined as calcium lactate, are administered.

In regard to the influence of calcium in facilitating the coagulation of the blood, Prof. W. E. Dixon (*British Medical Journal*, Vol. II, 1909, p. 540) has stated that when given by the mouth, absorption is only slight and very slow, and as it is excreted about as rapidly, the calcium content of the blood does not increase much, whereas, if given subcutaneously, the effect is quite different—the amount of calcium in the blood is decidedly increased and coagulation hastened. In his own case he obtained no effect when he took calcium by the mouth, but under the skin in fifteen minutes the coagulation time was reduced from 3½ to 1¾ minutes.

Calcium being thus excreted rapidly, its effect must be merely evanescent, and it would seem to be doubtful whether frequent subcutaneous injections would be a satisfactory treatment for intra-ocular hæmorrhages that may occur only, say, once a month.

Noll (*Zeitschr. für Augenheilkunde*, 1908) is inclined to the view that recurrent hæmorrhages into the vitreous may arise from:

(*a*) Anomalies of the blood, as leukæmia, oxaluria, pernicious anæmia;

(*b*) Circulatory changes met with about the age of puberty;

(*c*) Local vascular diseases due to malaria, septic absorptions, amyloid, hyaline, or sclerosing degenerations, hæmophilia.

Intra-ocular hæmorrhages in susceptible subjects have also been attributed to rapid changes of temperature, eye-strain, vascular diseases, and all sorts of hereditary diseases and tendencies.

Axenfeld is of the opinion that many are the result of tuberculous disease of the coats of the choroidal and retinal veins.

Davis (*Trans. American Ophthal. Society*, Vol. XIII, 1912) considers that he obtained good results from the use of tuberculin. He thinks, too, that auto-intoxication may play some *rôle* in the production. He doubts if the bleeding is ever from the choroidal veins. Thyroid feeding has been supposed to be of service. Venesection has been recommended. Such heroic measures as ligature of the carotid have been tried, but I doubt if any member of the Society would care to recommend that operation.

Cases.

In some of my cases there is a definite history of previous accident, *e.g.*:

D.B., male, *æt.* 32 years, was cut on the right eye by a piece of glass from the wind screen of a motor. The sclera was severed, up and out, and when first seen a few hours after the accident, there was a full hyphæma. The conjunctiva was stitched over the wound, and a good recovery followed, leaving merely some vitreous haze localised behind the site of the injury.

Three weeks later a definite reddish hue was observable in this opacity, and during the next five months, while he was under observation, fresh bright blood was distinguishable at the lower periphery immediately behind the clear lens.

I have in my mind, also, a boy who had a scleral cut, which healed well, but in whom fresh bleeding took place about three weeks later.

The explanation of this type of case is fairly obvious, the bleeding evidently coming from blood-vessels that had been damaged at the time of the trauma, or by rupture of new blood-vessels formed in the scar of the choroid or retina.

Another type of case associated with trauma is more difficult to understand.

H. C., male, *æt.* 29 years, hit himself in both eyes with the end of a whip on the 29th of March, 1914. The sight of the left eye was seriously interfered with by immediate effusion of blood.

I saw him on March 31st, and found the left anterior chamber quite full of blood. The right eye seemed to have entirely recovered from any damage done to it. The media were clear, the fundu normal. But three days later, the right anterior chamber had filled three parts full of blood.

I had the blood examined by Dr. C. H. Melland, of Manchester, who wrote as follows:—

"I am afraid that the results of the examination are mainly negative. There are no degenerative changes in red or white corpuscules, nor any marked diminution of blood platelets, such as one sometimes sees in hæmorrhagic conditions. I advise calcium lactate and arsenic."

By July the right eye was perfectly healthy again in appearance, and the vision had returned to full normal, but the left was able to perceive only fingers. The tension was rather below normal, and there was only a dull grey appearance in the pupil. The man was not a hæmophyllic.

My next case is of the spontaneous type, and although a blow on the forehead preceded the first attack of dimness, in my opinion it was a mere coincidence.

M. H. G., female, *æt.* 32 years, was seen on July 23rd, 1913, complaining of muscæ floating before the right eye. The visual acuity in each was perfect. The left eye showed no abnormality, and has remained perfectly good during the whole period in which she has been under observation. The right vitreous presented fine dust-like opacities, together with others rather larger and threadlike at all depths. In the right fundus below, and out from the disc there were five patches of very dark pigment, each about one-third the diameter of the disc, and a small atrophic patch down and in, with two white dots further towards the inner periphery. There was absolutely no evidence of any hæmorrhage into the eye on that date. But I was informed that the trouble in the eye came on quite suddenly, about fourteen days after having a somewhat severe blow between the eyes on the forehead, which happened eighteen months before I first saw her. During that period, the sight of that eye had become dim on two or three occasions.

By August 26th all the floating spots before the sight had gone, but in the retina there were some very fine grey lines radiating inwards from the optic disc. All vitreous opacities had disappeared. On the 31st of August, the sight of the right went dim in the morning, and on September 2nd, the acuity was 5/9 and J.2. There was a large vitreous opacity below, and in the fine radiating lines there were one or two reddish dots. The general vascular tension was 110 mm. of mercury.

She had suffered, a year or two before, rather severely from chilblains, and

Dr. Brian Melland, under whose care she was, had put her on calcium lactate for varying periods.

At this time I had the blood examined by Dr. Charles H. Melland, of Manchester, who wrote:—

"The percentage of hæmoglobin and the number of red corpuscles are normal, also the characters of the red and white corpuscles. I do not find any deficiency in power or rate of coagulation, no undue delay in a capillary tube, and no difficulty in getting the bleeding from a needle-prick to stop readily. From this I should judge that there is no deficiency of calcium salt, and that treatment by calcium chloride or calcium lactate is not worth persevering with. But as intra-ocular hæmorrhages are ascribed also to excess of the coagulability, I would certainly try the effect of citrates on the blood. I have made an attempt to find out whether there was any connection between the periodic hæmorrhages and the menstrual periods, bearing in mind Blair Bell's views as to the relationship between menstruation and the retention and excretion of calcium salts, but there appeared to be no such association. On the ground that possibly there may be excess of calcium salts, I would suggest use of thyroid extract, which appears to stimulate their excretion.

"There is no indication or any threatening of any more severe anæmia (as leucocythæmia, pernicious anæmia, or leucanæmia), such as are characterised by hæmorrhages.

"The only positive features that the blood does show is a distinct shortage of blood platelets. The practical significance of the blood platelets is somewhat disputable: but they do appear to play a part in the healing of injured blood-vessels, and so preventing hæmorrhage. One finds them greatly reduced in purpura hæmorrhagica, and to a less extent in pernicious anæmia. But nothing practically is known as to whether or how one can influence their numbers, but as they increase in number in cases of pernicious anæmia who are taking arsenic, I should advise your putting your patient on arsenic."

The eye cleared up within a week after the suggestions were carried out, but nineteen days later (September 21st), it became misty as before. On the 26th of September, there was a reddish blur on the posterior surface of the lens below, also at the extreme periphery below, there was a horizontal reddish irregular band. It was doubtful, to my mind, whether the tendency to hæmorrhages in the eye had anything to do with the patches of pigment; but, in the view of another oculist, these very pigment spots might possibly have arisen from small ruptures of the choroid.

In October citric acid was given, 15 grs. three times a day, and increased to 30 grs. three times daily, the course to last for fourteen days.

Patient again seen on February 5th, 1914, and in the meantime had had two attacks of hæmorrhage. The fundus appearances were much as before, and there were vitreous opacities at the lower periphery. Arsenic and thyroid extract were persevered with.

Next seen August 6th, 1915, when the patient reported that she had had several attacks of dimness, but the eye had been clear for as long as four months at one stretch. On that day the vision of the right eye was reduced to perception of hand movements. There was a very large dense vitreous cloud, obscuring nearly the whole of the fundus, and a small patch of red blood in the fossa patellaris.

About this time the patient consulted Mr. J. B. Lawford. By the 13th of August, that is, one week after being unable to see anything more than hand-movements, the acuity was 5/4. There was a broad streak of fresh red blood immediately behind the right lens, no definite vitreous opacities, no lesion of the large blood-vessels, but in the lower part of the vitreous there was a bluey-white dense cloud, and a thinner cloud near the posterior surface of the vitreous inwards. The appearances of the retina behind were very much as originally described.

The patient was greatly discouraged in that no treatment had seemed to be of any service. Locally, all the time I had employed drops of dionin four times daily for two days, alternating with three days without, of sufficient strength to bring about marked œdema and injection of the conjunctiva.

Lastly, there is a group of cases in which there was no trauma, of which the following are examples :

M.A.B., male, *æt.* 29 years, seen by me on the 6th of March, 1912. The sight of the left eye had been poor for six weeks, and varied in acuity from day to day. The vision was reduced to fingers. Large fresh red hæmorrhages could be seen behind the crystalline lens.

F.A., male, *æt.* 25 years, came to me on June 27th, 1912. The left eye had been affected seven weeks, and the right six weeks. He worked among basic slag, the dust of which often got into his eyes. The right vision was 5/36 and J.1 occasionally. The left 5/18 and J.1. There were large vitreous opacities in both eyes, chiefly in the central region, and one definitely red patch behind the right lens below. No lesion of the fundus was discoverable. On January 9th, 1913, the right vision was "fingers," and left 5/6 and J.1, and on July 23rd, 1914, the left acuity had gone up to 5/4 and J.1, and the only evidence of hæmorrhages was a small vitreous opacity anteriorly, below the line of sight. The right vision was "hand movement," and only a grey reflection was obtained from the fundus. This man was treated by calcium lactate for a period, and later by citric acid. For the eyes, drops of dionin were instilled. No definite cause for the hæmorrhages could be discovered.

F.M., male, *æt.* 8 years. Highly myopic (minus 18 D.) right and left, was seen in 1913. But on July 27th, 1914, the anterior chamber was half full of blood, and eventually the globe shrank following the hæmophthalmos.

J. E., male, *æt.* 31 years, came to me on January 23rd, 1914. The right eye had been failing three years, gradually, and the vision was reduced to shadows. The left had been good until seven months before, when fogginess of the sight came on. He had been in a hospital in Liverpool, without any permanent benefit. The right eye presented large vitreous opacities, with fresh hæmorrhages and partially decolourised clots. The left visual acuity was 5/6 and J.1, and the fundus showed one small rounded hæmorrhage in the upper periphery. The disc was deeply cupped, about 5.D. There were no evident lesions of the blood-vessels. The tension of each eye was + 1. The left field showed some slight contraction on the nasal side.

I took the man into the Royal Eye Hospital, Manchester, and did a trephine operation on the left eye. An uneventful recovery took place, and on February 26th, the visual acuity was almost as good as before. He now experienced no halos. The left disc was of better colour, and there was no trace of any hæmorrhage.

On May 14th, the right eye was in the original condition ; the left vision was 5/6 partly, and J.1, with a little difficulty. There were a few pigment spots on the anterior capsule, and some very fine grey deposits on Descemet's membrane ; also fine dust-like vitreous opacities, and one small hæmorrhage in the retina outwards.

He was again seen on March 16th, 1915, when the central acuity was 5/6 for the left eye. Although the peripheral field was slightly contracted generally, there were, in addition, two paracentral scotomata.

On May 20th, 1915, the patient saw a red streak in the field of his left eye which spread over the sight, and reduced the vision to 5/60. There were fine vitreous opacities and fresh blood in contact with the posterior surface of the lens below. Further hæmorrhages took place, and by 1916 the vision of the left eye is almost entirely gone, owing to dense vitreous opacities. The left eye, therefore, is pretty much in the same case as the right.

Remarks.

I have quoted these various cases, and could add quite a number of others. I freely confess that I am quite at a loss to know the explanation, in spite of all the suggestions made in literature, and especially, I think, that the known methods of treatment are by no means reliable, nor is it even always at once evident which line of treatment will best suit an individual case.

A CASE OF BOTULISM.*

BY
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Introduction.

BOTULISM presents a good many points of interest to the ophthalmologist as well as the bacteriologist, pathologist, neurologist, and also to the housewife and to the manufacturer of preserved foods. It is probably not so rare as it seems, because it is not always recognized. As botulism has never been made the subject of any communication to this Society, the report of a case, in which this seemed the most probable diagnosis, may be justified on the score of novelty, if of nothing else.

Case.

Miss X., aged 23 years, has a family and personal history which show nothing bearing on the present illness. For some weeks she had not been feeling as well as usual, and was overtired. On August 9th, 1915, she went to bed at ten, feeling as usual. Two hours later, she woke with diplopia and pains in the eyes. The next morning she went out on an errand, hoping to work it off, but was hardly able to get home alone on account of the vertigo associated with the diplopia.

When first seen by me, on the second day, the striking features presented were.—Total ophthalmoplegia except of the sphincter of the iris, that is, there was complete ptosis, and on raising the lids, the eyes were found to be immobile, pupils not dilated and reacted slightly to light, distant vision apparently good but needs convex lenses to read fine print by. Owing to the difficulty in fixation, it is not easy to decide whether vision is diminished; it certainly is not markedly diminished, although the patient complains that she cannot see well. Nothing abnormal found in the fundi, which were sufficiently well seen to detect any well-defined changes, but not sufficiently well seen positively to eliminate slight pathological conditions. (Later examinations under more favourable conditions confirmed the first finding.) There was distressing nausea, greatly exaggerated by the slightest movement. The patient has the room kept dark and dreads the light, although it causes no pain, probably because in the dark, the visual disturbance is more in abeyance, and so the vertigo and nausea are diminished. There is moderate dysphagia. Speech is somewhat difficult (tongue). No excess of mucus or disturbance of secretion in the mouth or throat. Bowels loose as a result of vigorous treatment with calomel, salts, and enemata. Has vomited many times. No facial paralysis detected, although later there was left facial paresis which lasted about six weeks. Hands show tremor, there is general muscular weakness, especially marked in the neck, so that the head cannot be raised from the pillow. Patient is somnolent, and sleeps eighteen hours a day, otherwise mental condition is clear and good. Pulse 110, respiration 25, temperature 102° F. Patient seriously ill, and a good deal exhausted even by the slight examination made.

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*Read before the American Ophthalmological Society at Washington, May 10th, 1916.

Additional data supplied by Dr. Marple who had charge of the case and to whom I am greatly indebted for permission to report it. Physical examination: nothing abnormal about mouth or throat except enlarged tonsils which have frequently been inflamed but at present show no active condition; no enlarged glands; heart and lungs normal except for old healed trouble at left apex; abdomen negative except for slight tenderness over the gall bladder and evidence of fæcal accumulation in the colon, both of which passed off in a day or two following free evacuation of the bowels. Urine, no abnormal constituents. Blood pressure 120. Blood count, white 7,000, red 4,500,000. Aspect of the case is that of severe toxæmia. von Pirquet negative; Wassermann negative.

No associated cases came to our notice, nor could the source of the poison be traced, as the patient for several days had been eating at various restaurants, and on several occasions had partaken of chicken salad and similar dishes.

Subsequent Course.

The fever subsided by lysis at the end of ten days, and thereafter for over a month ran a course ranging between 98° F. and 99.4° F. The vomiting lasted for one day only, but the nausea continued for weeks, and even after months, a sudden movement in the wrong direction would cause nausea and vertigo. Somnolence lasted for twelve days. Appetite and strength slowly returned.

On September 18th, six weeks after the first symptoms, she was sitting up, and when with help, she walked across the room to meet me, both weakness and inco-ordination were in evidence. With the aid of the frontales, the lids could be raised enough to see without using the finger to lift the lid, as had been necessary when last examined. The eyes were not wholly immobile, there being some power of convergence. With +4 D. lens she read the finest print over a range from 25 cm. to 14 cm., equal to 3 diopters of accommodation.

October 22nd, first seen at my office, V.O.D. with + 0·75 cyl. ax. 20° = 6/8. V.O.S. with + 0.75 cyl. ax. 175° = 6/10. Right eye moves 2 mm. in the horizontal meridan, left eye 3 to 4 mm.; no perceptible vertical movement.

The ptosis diminished slowly but surely and there was a similar slow gain in the movements of the eyeballs, especially in the horizontal plane. Thus, in November prisms of 6°, bases in, were ordered for each eye, to facilitate single vision, and were worn with comfort. In December they were reduced to 4° each eye; in January to 3°; in February to 0.

But meantime the vertical deviation, not over 1/2° in October, had increased, so that in February 3° were required to correct it and in March 4° were worn, the right hyperphoria reaching 6° at one time.

During all this time control of the other muscles was improving. Writing was affected only during the acute stage, so with voice and swallowing, these rapidly improved and became normal during the first 6 or 8 weeks. Piano playing, which showed loss of control rather than weakness of hands and fingers, became normal about the 1st of March. Weakness of the legs, which showed itself when trying to get up from the floor, is still present, although much improved. Lack of control of the head was only noticeable on fine tests. When fatigued, the head showed slight unsteadiness, and as the eyes were unable to make the compensatory opposite movements promptly enough to preserve constant fixation, the V. appeared diminished. If the head was steadied in some way, the eyes were then able to fix and the V. was restored to its usual standard.

Diagnosis.

The diagnosis in this case was based entirely on the clinical symptoms. The source of the poison was not traced, and therefore there is no proof that the diagnosis is correct. There are not many other possibilities to be considered in making a differential diagnosis. It is evident that we have to do with an acute paralysis of the muscles of the eye, throat, and various other parts of the body. The very rapid onset, the absence of sensory symptoms, the absence of gastro-intestinal symptoms, and the presence of somnolence are striking features. In making my diagnosis I simply went over Uhthoff's list of the possible causes of ophthalmoplegia based on a very exhaustive search of the literature covering all reported cases. The acute and subacute forms of ophthalmoplegia alone needed to be considered. These are classified under: intoxications, infections, trauma, and unknown. Under intoxications are listed :—

(1) Alcohol (acute hæmorrhagic polioencephalitis superior of Wernecke).
(2) Lead.
(3) Botulism.
(4) Carbon monoxide.
(5) Nicotine
(6) Snake bite.

The only one of these to be considered for a moment is botulism, unless we recognize the first as not always alcoholic.

Under infections are listed :—

Diphtheria.
Influenza.
Measles and other exanthemata.
Miliary tuberculosis.
Exposure to cold.
Syphilis.

For a while tuberculosis was adopted by one of the consultants as the most probable diagnosis, but it was early given up. There is no evidence whatever of the existence in our case of any of the other infections.

Trauma may easily be excluded, and there remains the group of cases of unknown ætiology. It is possible that ours should be placed here. Hysteria was early considered, but early abandoned as a possible diagnosis.

The place of Botulism among the Bacterial Food Poisonings.

There are three types of bacterial food poisoning. The first is due to eating the meat of diseased animals, the second to putrified meat, the third is botulism. Ptomaine poisoning is no longer recognized as a common cause of food poisoning, although still most popular with the laity and not a few medical men.

The first, caused by eating the meat of diseased animals, is the most common. It is due to B. enteritidis, B. paratyphi type B., and related forms which infect the animal during life, but do not alter the appearance, smell, taste, or consistency of the meat, which is therefore readily eaten. It is easy to see that when the meat is made into sausage, where liver, spleen, and other organs in which bacteria abound are all ground up together, harm is more likely to follow. The symptoms are due to the toxic metabolic products of the growth of the bacilli in the meat, and also to their activity after reaching the intestine. Thus, the illness may be very acute, due to the toxins already present in the meat, and rapidly following its ingestion, or it may develop more slowly like a true infection resembling a para-typhoid fever, with which it is probably often identical. One readily understands how, if the animal was suffering from diarrhœa before being slaughtered, meat from the carcase, especially sausages, may carry the offending organism to the careless or unconscious eater. Sound meat is easily infected, and bacilli carriers who handle the meat, either in the kitchen or elsewhere, are an obvious source of danger. Cooking destroys the infecting bacteria, but does not destroy the toxins, so that the severest cases follow eating the raw meat, but poisoning may occur after eating cooked meat. The symptoms are those of a gastro-enteritis, often with skin lesions. Diagnosis is difficult. 2 per cent. to 5 per cent. of the cases are fatal.

The second group is due to decomposed meat, which may have been perfectly sound and healthy when slaughtered. Not all decomposed meat is poisonous ; only when the decomposition is caused by certain organisms, or perhaps under certain favourable conditions. Meat that is more or less decomposed is eaten every day with impunity. For example, game or other meat that has hung too long, putrid fish, and cheese of various kinds. In all of these a great variety of organisms are found which seem to be harmless, or relatively so. The organisms most frequently found in the cases where decomposed meat has caused poisoning are B. proteus and B. coli. The meat contains toxic products produced by the growth of the bacillus, and the bacillus may continue to grow and produce toxin after it has entered the intestine of the victim. Cooking does not easily destroy the toxin. The symptoms are gastro-intestinal ; and the course is rapid, usually without fever. Deaths are infrequent.

The third form of meat poisoning is botulism. The organism, B. botulinus, is a large anaërobic bacillus, allied to the tetanus bacillus. It does not grow well at the body temperature and all its mischief is done outside the human body, *i.e.*, it is never a parasite. It is said to be the only pathogenic micro-organism that grows best at room temperature, not body temperature. Although it forms spores, these are fortunately not very resistant. Heating to 180° F. for half to one hour is fatal to them.

B. botulinus is an obligate anaërobe, and has most often been met with in sausages of the large type ; the name " botulism" is from the Latin for sausage and the synonym, " allantiasis," is from the Greek for sausage. It is also found in ham, canned foods, especially beans, usually home-made, pickled fish or meat where the brine is too weak. Ten per cent. salt solution will prevent its growth. While an obligate anaërobe when grown by itself, it can grow symbiotically with ordinary putrefying organisms under apparent aërobic conditions, the putrefying organism protecting it from the oxygen. Its growth in suitable media is associated with the liberation of gas, so that cans in which it has grown show bulging ends, are " blown," as it is called, also bubbles of gas may be found in the liquid. The odour associated with the growth of the B. botulinus is characteristic : it is not putrid or fœtid but rancid, strongly resembling butyric acid. The toxin produced by its growth is intensely poisonous, ranking in the class with tetanotoxin. An antitoxic serum can be produced in a similar way as in the case of tetanus and diphtheria, and this is kept on hand by the Government in some cities for use when needed. Unlike most bacterial toxins, botulin can enter the system by the gastro-intestinal tract without being destroyed, although it takes a larger dose than when administered subcutaneously. Like tetanotoxin, botulin has a strong affinity for cerebro-spinal tissues, especially gray matter. If 0·1 cc of bouillon culture is mixed with one gram of brain tissue rubbed up with normal salt solution, the resulting mixture is several times less toxic than a similar dilution with indifferent material. That this is not due to any destruction of the toxin but only to its union with the tissue is shown by the fact that simply drying will break up this union and restore the toxicity. Like tetanotoxin, it is slow in being absorbed and uniting with those tissues for which it has an affinity and which it injures, so that *there is always a considerable interval between the administration of the toxin and the first symptoms*, usually one day, sometimes longer or shorter. Abdominal pain is rare, but the stomach and bowels show in many cases a marked atony which makes cathartics and emetics ineffectual and may be one factor in the prolonged period of incubation, since absorption is slower. Hence the importance of washing out the stomach, even if the patient is first seen several days after the ingestion of the poison. The chemical character of the media on which B. botulinus is grown makes a good deal of difference in the resulting toxin. This may explain why different epidemics show differences in their symptoms and severity. There is evidence also that different strains of B. botulinus occur, as appears to be the case with so many micro-organisms. Thus the anti-toxin prepared from the original strain of B. botulinus, isolated by van Ermengem, was found by Leuchs not to act on the toxin from the Darmstadt strain isolated from some canned beans, and *vice versa* the Darmstadt strain anti-toxin had no effect on the toxin from the van Ermengem strain.

The pathology and pathological anatomy of botulism have not been satisfactorily elucidated. Soon after the organism was discovered by van Ermengem in 1895, Marinesco studied the pathological anatomy of experimental botulism. He was followed by Kempner and Pollack, Ossipoff, Römer, and Stein. van Ermengem sums up the findings of these investigators as follows: it produces a cloudy, fatty degeneration of endothelium, secretory cells of certain glands, striated muscle fibres, and especially cells of the anterior horns of the cord and its prolongation upward through the medulla and pons as far as the nuclei of the third nerve. These lesions are absent for the most part from the brain and entirely from the cerebral and spinal nerves. All these investigators agree that the motor ganglion cells are affected primarily by the toxin, resulting in a degeneration of the Nissl bodies. It is because the toxin has a specific affinity for certain cell groups that we get so sharply defined a clinical picture. Wassermann would explain this action on the basis of the Ehrlich theories as due to the fact that the haptophore groups of the toxin molecule have a special affinity for the receptors of these cells.

Now Wilbur and Ophüls and Dickson, all of Stanford University, (California), have recently studied the lesions in some fatal cases of botulism and in experimental botulism in animals. They deny the validity of the results reported by the European investigators, and claim that the primary lesions are in the blood vessels, *viz.*, thrombosis and hæmorrhages. As a result of the circulatory disturbances thus produced, we get changes in the nerve cells. These investigators are still carrying on their researches, and one must suspend final judgment. So far their statements and evidence furnished are not entirely convincing. In attempting to decide between these rival theories, one naturally turns to other diseases with allied pathology, such as tetanus, diphtheria, rabies, acute anterior poliomyelitis and polioencephalitis, cerebral syphilis.

In favour of the contentions of the California investigators, we may cite the change of view that has occurred in the case of acute anterior poliomyelitis. It was taught by Charcot and pretty generally agreed that the primary lesion was a degeneration of the motor nerve cells of the anterior horns of the cord due to a toxin. But it has been shown that this is not the case. The germ itself reaches the spinal cord, and the lesions are inflammatory. So it was thought that the cerebral lesions produced by syphilis in cases of general paralysis were due to a toxin, but it has been proved that spirochætes are present and that the nature of the lesion is probably an inflammation. The nature of the lesions in tetanus is not known. In diphtheria we have conflicting claims. There seems to be good evidence of changes in the peripheral nerves and also in the nerve cells; the latter may be secondary to the former. Thus, the evidence is conflicting, and the pathological anatomy of botulism cannot be regarded as settled.

The clinical symptoms of botulism present a sharp contrast to other forms of bacterial meat poisoning. Instead of gastro-intestinal symptoms, we have the central nervous system affected, and it is only the efferent nerves, *viz.*, motor and secretory, that are involved, although I am inclined to think that the secretory symptoms are due to the direct action of the toxin on the glandular epithelium rather than on the nerves.

Usually the eyes are the first to be affected, and in mild cases the paralysis may be limited to them. In more severe cases the lower motor cell groups in the bulbar region and in the cord are involved, but none of the sensory nerve centers. If the respiratory centers are sufficiently affected, death follows from asphyxia. The difficulty in swallowing, combined with the frequently altered secretion in the throat, make aspiration pneumonia a frequent cause of death.

Whether there are any disturbances of vision not due to the motor paralysis is not certain. This matter is worthy of study when suitable cases afford the opportunity. No significant retinal or optic nerve changes have been reported, but nearly all reports of epidemics mention various degrees of blindness, sometimes spoken of as amaurosis. Of course, the difficulty in fixation, the loss of accommodation, and the dilated pupils, not to mention the ptosis, are enough to make the patients complain of blindness. They do not sharply distinguish, as we do, between poor vision due to disturbances in the perceiving apparatus of the eye, and difficulty in seeing due to the adjusting mechanism of the eye for focussing and fixation. As our patient said: " What difference does it make about my optic nerve? If I can't open my eyes, or look at anything, I am blind."

The mortality varies a good deal in different epidemics, as is natural from the character of the toxin and its variation under different conditions of growth, age, and possibly partial cooking; heating to 180°F. destroys the toxin of botulism, unlike the toxins in other forms of bacterial meat poisoning. Thirty years ago, 412 cases were collected by Senkpiehl, with a mortality of 40 per cent. Some epidemics show a mortality of 100 per cent., some as low as 10 per cent., or rarely no deaths. 50 per cent. is regarded as about the average to-day.

Bibliography.

For a survey of food poisoning, to place botulism in its proper perspective from that point of view, consult *Bacterial Food Poisoning* by Dieudonné, of Munich, translated by Bolduan, of New York; also articles by Novy in *Modern Medicine* (Osler and MacRae), Vol. I, and in *Reference Handbook of Medical Science.*

For a survey of ophthalmoplegia, to place botulism in its proper perspective from that point of view, consult Uhthoff in Graefe-Saemisch-Hess *Handbuch*, Vol. XI, under Ophthalmoplegia, p. 472, and under Poisoning, p. 164.

For the history, bacteriology, symptomatology, pathology, immunity, etc., consult the monograph by van Ermengem, of Ghent, in *Handb. d. Path. Mikroörg.*, Kolle und Wassermann, Vol. IV, p. 909; also Leuchs, same volume, p. 939. van Ermengem was the discoverer of B. botulinus and this article is the best single article on the subject.

Wilbrand and Saenger, *Neurologie des Auges*, give a brief discussion of botulism under Ptosis due to Poisons, Vol. I, page 278.

For the recent American work on the subject see Wilbur and Ophüls, *Archives for International Medicine*, October, 1914, p. 589, and Dickson, *Journal American Medical Association*, Vol. XLV, 1915, p. 492.

All the above articles have copious bibliographies.

DIAGNOSIS IN UVEITIS.*

BY

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(Continued from p. 46).

SECOND PART.

Having concluded this brief survey, I now pass on to an account of my own work on the subject during the year.

My original intention was to produce an artificial uveitis in a rabbit's eye by an intra-ocular injection of a known bacterium, and then in due course to examine the aqueous humour for the various specific antibodies.

After a short time, however, I confined myself entirely to the search for amboceptor, as the "fixation of complement" method, whereby it could be detected, seemed to present the fewest difficulties. The first series of experiments aimed at the detection of amboceptor in the aqueous humour; the second, at discovering the presence or absence of its local production.

I shall first describe the *technique* employed, and then review the separate experiments. Several of these latter have not led to any practical result, owing to faulty methods. However, as I feel that useful knowledge may be gained by a recital of mistakes, I shall not omit them.

The essentials of the test are as follows.—A mixture, containing (1) antigen, the infective agent, (2) the serum suspected of containing its specific amboceptor, and (3) complement, is allowed to stand long enough for union to take place between these three elements. A second mixture, containing (1) red blood-cells, and (2) a serum capable of hæmolysing these cells, but from which complement necessary to this process has been abstracted, is then added. If the specific amboceptor be present in the first mixture, its union with the only available complement present makes hæmolysis of the blood-cells impossible ; if absent, the complement is left free to unite with the second serum, and hæmolysis does take place.

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* Mary Louisa Prentice Montgomery Lecture, delivered in the School of Physic in Ireland, on June 23rd, 1916.

My *technique*, which had to be improved from time to time, may best be considered in its latest developments under the following headings :—

1. Preparation and dosage of bacteria to be injected.

As a fresh culture of organisms is likely to produce a greater quantity of antibodies than a long-standing one, the former was used where possible (22). An over-night agar or serum slope of the organism, emulsified in normal saline, was well shaken, to break up large clumps. The emulsion was then subjected to 60° C. for an hour. This latter treatment will kill most organisms, thus reducing considerably such reaction as would follow their injection. At the same time, however, it does not entirely remove their power of stimulating the production of antibodies.

The dosage was gradually increased in subsequent injections by diminishing the heat to which the emulsion was subjected. The amount of diminution depended on the reaction which had followed the preceding injection.

Antibodies were usually sought for within a fortnight of the last of two to four injections, given at intervals of about a week. The same plan was followed whether the injections were given intra-ocularly or intra-venously.

2. The method of injection.

In intra-ocular injections the needle was passed obliquely forwards and inwards through the conjunctiva, sclera, and ciliary body, and the contents of the syringe then evacuated. This operation was always performed under general anæsthesia. If a conjunctivitis supervened, the eye was treated daily with argyrol.

If the intention was to give not a local but a general infection, the intravenous route was chosen as giving the speediest results (22). The animal was placed in an incubator at 37°C. for a few minutes, which caused considerable enlargement of the superficial veins. The hair over the marginal vein of one of the ears was then rapidly removed with sodium sulphide solution, and into this vessel the injection readily made. This operation, causing practically no discomfort, required no anæsthesia.

3. The withdrawal and preparation of fluids for examination.

The aqueous humour was always withdrawn under general anæsthesia. The needle of the syringe was inserted into the anterior chamber through a fairly central portion of the cornea. This insertion, by avoiding what in these cases often became a vascular limbus, and also by lessening the risk of bruising the iris, tended to prevent blood becoming mixed with the aqueous. The position of the needle increased the risk of producing cataract, but in these experiments the occurrence of such did not signify. The amount withdrawn varied, according to the condition of the eye, from 0.01 to 0.2 ccs. In most of the samples obtained, a clot formed within a few minutes: this clotting does not occur in the normal aqueous (13), (28). The fluid, in contact with its clot, was preserved in a chemically clean glass vessel in an ice-chest for 24 hours before being examined.

When blood was to be withdrawn, the animal's ear was treated as previously mentioned. From a marginal vein punctured with a large needle several ccs. of blood could be readily procured. It was preserved in the same way as the aqueous humour.

4. The examination of the fluids for specific amboceptor.

The components of the test were as follows:—(*a*) *The antigen.*—This, in all, except the syphilitic and tuberculous cases, was made from the identical organism that had caused the infection. An antigen should have (1) a high power of combining with its specific amboceptor; (2) as low a power of combining with complement in a non-specific manner as possible; (3) regularity in its working.

Bacterial antigens may be made by emulsifying organisms intact, or by extracting their endotoxins, and discarding their bodies. A great deal of work has been done on this subject (1), (10), (19), (22), (23), (28). The most prevalent view would appear to be that the bacterial extracts are more satisfactory than the emulsions, having a lower anti-complementary power, and greater regularity in their working. I have employed both as antigens. The emulsions, bacteria in normal saline solution, were prepared by being shaken for half an hour, heated at 60° C. for one hour, and preserved in the ice-chest, after addition of one-half per cent. carbolic acid. The extracts were prepared by freezing an emulsion in liquid air, allowing it to thaw at room temperature, centrifuging down the bacterial *débris*, and preserving the supernatant fluid in the ice-chest, after addition of one-half per cent. of carbolic acid. The freezing of bacteria renders their protoplasmic coverings more permeable, and in this way allows for the liberation of their endotoxins.

The liquid air was procured for me through the kind assistance of the Registrar of the Royal Dublin Society and Dr. Henry Dixon.

My experience as to the respective merits of these antigens is too limited to be of value, but I found the extracts more satisfactory. The syphilitic antigen was one already in use for "Wassermann" reactions in the Pathology School of Trinity College. It consisted of an alcoholic extract of sheep's heart, to which was added 0·4 per cent. of cholesterin. The tuberculous antigen employed was Koch's "old tuberculin." Various preparations of the tubercle bacillus have been used in "fixation complement" tests (3), (4), (11). In the hands of one observer—namely, Fraser—"old tuberculin" would appear to have been the most satisfactory (15).

(*b*) *The fluids for examination.*—The clear aqueous and the blood serum having been removed from their respective clots, they were heated at 57° C. for half an hour, almost immediately before examination. This destroys complement, leaving amboceptor intact, and is described as "inactivation." It should be noted here that although the presence of complement in the normal aqueous humour has not apparently been proved, it has been detected in cases of intra-ocular inflammation (25), 34a).

(*c*) *The complement.*—Fresh guinea-pig serum supplied this. Complement as used in this test should possess two qualities. 1st. It should show a readiness to be "fixed" by an antigen and its specific amboceptor. 2nd. It should possess the power, if not already "fixed," of readily activating the hæmolytic amboceptor on its addition in the second part of the test.

Unfortunately for the simplification of my *technique*, the complement in rabbit blood, while possessing an active hæmolytic power, is not readily "fixable" (22). Guinea-pig complement, on the other hand, possessing both these qualities, was more suitable. A known amount of complement was always employed in the carrying out of the test; hence the necessity for the [illegible] of a [illegible] complement, as previously mentioned.

(*d*) *The hæmolytic system.*—This consisted of :—

(1) Sheep red blood cells, freshly obtained, and well washed in normal saline solution.

(2) Inactivated horse serum, containing hæmolytic amboceptor to sheep cells, as purchased from Messrs. Burroughs, Wellcome & Co.

These, then, are the components of the test. I now turn to a description of its *technique*. The method I used was almost identical with that employed by Dr. Meldon, of the Westmoreland Lock Hospital, in his "fixation of complement" tests with syphilitic sera. He generously gave me the benefit of his past experience, and rendered me valuable assistance throughout.

The quantities employed were as follows :—

Antigen, suitably diluted—80 cm.
The fluid for examination—20 cm.
Complement suitably diluted—40 cm.
Hæmolytic system—20 cm.

This latter was prepared by adding to one part of centrifugalised red blood cells, two parts of hæmolytic serum diluted 1 in 100—this mixture was in its turn diluted 1 in 10.

If any of the components of the tests were omitted, the total quantity of 160 cm. was maintained by the addition of normal saline solution, the diluting medium employed throughout.

The diameter of the glass tubes used was 6 mm. These and the pipettes employed were all chemically clean.

The following quantitative estimation of the suitable dilutions of antigen and complement was made preliminary to the test on every occasion. Varying dilutions of antigen and a fixed quantity of complement were incubated at 37° C. for three-quarters of an hour.

The hæmolytic mixture was then added, and the tubes incubated for an hour. During this hour varying dilutions of complements added to the hæmolytic mixture were also incubated. It may be here noted that the sheep cells and hæmolytic amboceptor was always incubated after their mixture for half an hour before use, this rendering the latter more active. The two sets of tubes were left for about one hour at room temperature before the results were read off. The lowest dilution of antigen showing a trace of complement fixation was noted, and used in the final examination at a further dilution of 1 in 4. The highest dilution of complement, allowing complete hæmolysis was noted, and a dose two to three times stronger subsequently used. The incubation times in the test were the same as those just mentioned for the quantitative estimations.

Each test was accompanied by the following controls :—

(*a*) *The antigen control.*—This consisted of a mixture containing antigen, complement, and hæmolytic system : if this tube did not show complete hæmolysis, positive results were of doubtful value.

(*b*) *The serum* (*aqueous humour*) *control.*—This consisted of a mixture of the serum (aqueous), complement, and hæmolytic system : similarly here the absence of complete hæmolysis rendered positive results of doubtful value. It may be noted under this heading that sera (aqueous) in low dilutions may, in rare instances, give a negative result in "fixation of complement" tests, at the same time giving, in the higher dilutions, a positive result. This is said to be due to the concentration in the lower dilutions of amboceptoids. These bodies combine more readily with antigen than the amboceptors ; they have, however, no power of combining with complement. Thus, although a specific interaction may have taken place, complement is left free to produce hæmolysis and show a negative result (22). From this the importance of examining a range of dilutions may be seen.

(*c*) *The hæmolytic system control.* — This consisted of a mixture of complement, cells, and hæmolytic amboceptor. Complete hæmolysis demonstrated the accurate working of these components.

(*d*) *The sheep cells control.*—If a mixture of cells and normal saline solution showed any hæmolysis, the cells were discarded as unfit for the test.

(*e*) As a final control may be mentioned the testing of the serum (aqueous) with not only its specific but also a non-specific antigen. In this way the diagnostic value of a positive reaction could be more clearly demonstrated. The results of the test were estimated after the tubes had stood over-night at room temperature.

The results were expressed in the recognised manner :—

+ 3 = complete inhibition of hæmolysis.
+ 2 = } grades of partial inhibition of hæmolysis.
+ 1 = }
— = complete hæmolysis.

I now pass on to a *résumé* of the separate tests. I propose to group the first series, which aimed at the detection of amboceptor in the aqueous humour, according to the organism injected.

1. THE BACILLUS COLI.

1st Experiment.

12.4.15.—O. D. rabbit No. 1 injected two million bacillus coli. Major part regurgitated subconjunctivally ; only conjunctivitis resulted.
19.4.15.—O. D. injected three million bacillus coli.
22.4.15.—O. D. acute iritis.
29.4.15.—Aqueous humour O. D. examined with coli antigen. Antigen control inhibiting complement—test a failure.
3.5.15.—Further attempt at examination failed, as withdrawal of sufficient aq. h. proved impossible owing to development of panophthalmitis.

2nd Experiment.

5.5.15.—O. D. rabbit No. 2 injected five million b. coli.
7.5.15.—O. D. iritis.
13.5.15.—Aq. h. O. D. examined with coli antigen.

Result :—Aq. h. O. D. undil. $+^3$
O. [illegible]
antigen control $+^1$
aq. h. „ omitted.

In this connection it should be noted that the anticomplementary actions of a serum (aq. h.), and an antigen are greater when mixed [illegible] than when tested separately; [illegible] results in cases of mild inhibition of antigen and serum should therefore be accepted with reserve.

[illegible]—Aq. h. O. D. withdrawn. Examination of no value, owing to admixture of blood.

3rd Experiment.

1.6.15.—O. S. rabbit No. 3 injected 12 million b. coli. heated half hour 50° C.
2.6.15.—O. S. iritis.

10.6.15.—Aq. h. O. D. examined with coli antigen.
Result :—Aq. h. O. S. undil. $+^2$
,, O. D. ,, —
Aq. h. control omitted ; other controls satisfactory.
23.6.15.—Aq. h. O. S. examined with coli and typhoid antigens.
Result :—Aq. h. O. S. undil. coli a. $+^3$
,, ,, typhoid a. —

In this and subsequent tests, controls, if not stated to the contrary, were satisfactory.

4th Experiment.

31.5.15.—O. S. rabbit No. 4, injected 0.1 of 10 ccs. over-night broth culture of coli.
2.6.15 —O. S. iritis.
10.6.15—Aq. h. O. D. examined with coli antigen.
Result :—Aq. h. O. S. undil. $+^3$
,, O. D. ,, —
Aq. h. control omitted.
23.6.15.—Aq. h. O. D. examined with typhoid antigen.
Result :—Aq. h. O. S. undil. $+^1$
,, O. D. ,, —
,, O. S. control $+^1$

2. STAPHYLOCOCCUS AUREUS.

5th Experiment.

1.9.15.—O. D. rabbit No. 5, injected 5 million staphylococci, heated 40 min. 58° C.
6.9.15.—O. D. no reaction, injected 10 million st., similarly treated.
8.9.15.—O. D. mild iritis.
Aq. h. O. D. examined with st. antigen.
Result :—Negative.
15.9.15.—Aq. h. O. D. examined with st. antigen.
Result :—Aq. h. O. D. undil. $+^2$
,, control omitted, but subsequently tested with slight blood admixture showed no inhibition.
17.9.15.—O. D. injected with st. extract : strength equivalent to four th. m. bacteria.
18.9.15.—O. D. acute iritis. Further attempts at examination of aq. h. failed owing to blood admixture.

3. TYPHOID BACILLUS.

6th Experiment.

1.9.15.—O. D. rabbit No. 6, injected five m. typhoid b.
3.9.15.—O. D. mild iritis.
6.9.15.—O. D. again injected as above.
15.9.15.—O. D. acute iritis.
Aq. h. O. D. examined with typhoid antigen.
Result :—Negative, and valueless, subsequent examinations of antigen showing absence of antigenic power at strength used.

(*To be concluded.*)

CLINICAL MEMORANDA.

A NEW METHOD OF COLOURING THE EYEBALL IN CASES OF CORNEAL OPACITY.

BY

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I SHALL be much obliged if you will kindly insert in your Journal the following preliminary note on a new method of colouring the eyeball in cases of corneal opacity where no sight can be restored.

This is done by separating the conjunctiva all around at the corneo-scleral junction, undermining it, and then stitching the margins in front of the cornea, so as to cover it completely. An artificial pterygium, covering the whole of the front of the eyeball, is thus formed. Lamp black, obtained by burning a castor oil lamp and collecting the deposit called "Kajal" in Urdu*, is then tattooed into the conjunctiva, or an emulsion of lamp black injected subconjunctivally or placed over the opacity first and the conjunctiva stitched. This method is specially useful in cases where the cornea has sloughed off and the opacity is on the iris, as in anterior staphyloma after prolapse of the iris.

No wound is made in the eyeball itself, hence there is no danger of infection of the eye, or of sympathetic ophthalmia. If a repetition is ever necessary, it can easily be done without the patient remaining in hospital or having any after-treatment. The colour is much more evenly distributed than in ordinary tattooing of the cornea. After a time leucocytes carry the pigment deeply into the conjunctival and subconjunctival tissues and infiltrate them with it. The conjunctiva is a translucent structure, and the pigment shines through it just as clearly as the white of the sclerotic is seen through it.

In cases of large anterior staphylomata, the staphyloma may be excised by de Wecker's method, as described by Colonel Maynard in his "Manual of Ophthalmic Operations;" or, after staphyloma has been excised, the cut margin of the sclerotic may be brought together and stitched up with catgut, and the conjunctiva can then be sutured in front of it. I do not think that stitching the sclerotic increases the danger of sympathetic ophthalmia.

The sclerotic will give better protection to the uveal tract than either the cornea or the staphyloma, which is, after all, only exposed iris with a white scar on it; hence subsequent danger of sympathetic ophthalmia in the sound eye is less. The colour deepens as time goes on, and as the conjunctiva gets more and more adherent, the redness passes off, and the transparency of conjunctiva is again restored. Pigmentation lasts much longer than it does after tattooing the cornea.

MEMORANDUM ON TRANSILLUMINATION.

BY

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It happened recently to be a matter of urgency to decide if a retinal condition were due to simple organized detachment or to new growth. There was no transilluminator in my bag, and although the registration of the Schiötz tonometer was in my opinion quite diagnostic (T of 4 mm. Hg.) it was, for certain reasons, very desirable in this case to have every proof at hand. I had some (American) droppers in my bag, in which the end is 1.5 inch long and made of thick soft rubber, about 1/16 inch thick. I slipped one off its glass tube, pierced the tip with a pin, then with a fine rat tail file enlarged the pin prick to a perfectly round hole of 3 mm. diameter. I had with me the independent pocket rheostat battery of my design (1909 Meyrowitz, New York and London), and an electric ophthalmoscope of the Dennett type. It is simplicity itself to remove the ophthalmoscope from the stem and slip the rubber cap over the lamp. One drop 2 per cent holocain, when all stinging ceased, enabled me to make a perfect transillumination test at once, and to clinch the diagnosis.

I have since repeated the experiment with success, and find it possible to reduce my portable instruments by one item.

The small resistance coil I had placed under the cap of the battery case, turning the whole into a rheostat battery, proves as useful here in allowing the illumination to be modified *ad lib.* as it has proved invaluable to me in connection with portable electric ophthalmoscopes, to some of which I believe it has since been adapted. I myself prefer a separate battery, as it can be used in many other ways conveniently; I charge it with the British Ever-Ready Dry Battery No. 1547 (price 1/3) which lasts four months at least, sometimes six. I have used the same outfit since I had it made for me seven years ago, and have never had a day's inconvenience with it.

TRANSLATION.

THE WORK OF THE OPHTHALMIC SURGEON IN WAR.*

(Die augenärztliche Thätigkeit im Kriege.)

BY

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SURGEON IN CHARGE OF AN EYE STATION.

SPECIALISM, which has developed solely as the product of free competition, without State control, and without official State recognition, failed on this account at the beginning of the war to obtain consideration, as such, from the military authorities. On the whole, it was more and more drawn upon as the necessity for it became apparent, and the need for ophthalmic surgeons proved to be above all expectation. Sight-testing is an important part of their work, and this "glass-fitting" (which is looked down upon, not only by the laity, but also by doctors) presupposes an unusual degree of special experience, while it has been a factor of enormous importance, undreamt of by the general public, in recovering for the army men exempted on account of refractive errors. By the work of oculists a whole army has become fit for field service.

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* Translated (slightly abridged) from the *Deutsch. med. Wochenschrift*, 1915, p. 1,459.

In peace, myopes of over 6.5D., and most cases of astigmatism, were considered unfit for service, even in the reserve. Now that an official regulation has suspended the rigid limits determining fitness during peace, it has been left to medical officers (in their respective spheres) to arrive at an understanding of the requirements which the various forms of war activity exact from the organ entrusted to their special investigation. An understanding of the needs of the various individual branches of the service is best obtained by direct observation [presumably of troops working under service conditions.—TRANS.], which should be controlled at every available opportunity by conversation with men returned from the front. As a result of such experience, one may say that if the eyes are otherwise healthy, no error of refraction causes unfitness for field service, provided that the corrected vision is adequate. This must be more than 1/3 in the better eye. Naturally, such considerations do not in any way interfere with the service regulations which hold good during peace; there is, however, some difficulty in connection with the classification into "unfit" and "fit" for labouring work, garrison service, and field service, a division otherwise very convenient, but unsuitable for the eye, especially in regard to the question of visual capacity.

Some forms of service, which in other respects require great physical ability, make little demand upon eyesight. The highest standard is required from the navy and the flying corps, while for infantry and cavalry of all kinds the standard already mentioned may be adhered to. In both foot and field artillery only about half the men, team leaders, gun layers, observers, and telephonists, require this standard; a fact which has hitherto been overlooked, and has not been allowed for. Vision equal to 6/36 in the better eye will meet the needs of the remaining half, who do not require particularly good sight. This limit must also be regarded as the lowest for men fit only for labouring work. The vision of thousands of men, otherwise fit for field service, falls between these limits of 6/18 and 6/36. Men of the *Landsturm*, who have not served [*i.e.*, exempted for physical defects, or other reasons, during peace.—TRANS.] provide a large number of short-sighted soldiers who can be employed in munition and commissariat columns, as well as in the artillery, and not exclusively in the making of entanglements. Here, also, vision is required as high as for the above-mentioned branches, for spades and barbed wire are dangerous tools, and the workers often injure one another. Exactly in this group, however, are placed those with the worst vision, as well as those with relatively the poorest physique otherwise. Between men fit only for labouring work and men able for full field service come those fit for garrison service. These men may be used in the most various ways, often for infantry service in the garrisons, because they are unable to march. There is, therefore, no intermediate grade between men fit for full field service and men fit only for labour which can be utilised by the ophthalmic surgeon.* Many astigmatics and hypermetropes may be more suited to field service than to office work, which, however, derives its *personnel* from those fit for garrison duty. The ophthalmic surgeon should, therefore, as far as possible, pay special attention to suitability.

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* [illegible]

Subjective testing is very closely connected with another sphere of ophthalmic work, that of giving an opinion. [In regard to malingering, etc.—TRANS., "*Gutachtliche Thätigkeit.*"] That they cannot see, seems to shirkers the simplest and most plausible assertion. Medical officers of small garrisons complain especially in this respect, as they have not the necessary apparatus to test the statements of the recruits. In these circumstances, simulation becomes infectious and spreads, while, on the other hand, a thorough objective examination increases confidence in a strict and just decision. The time spent on the detection of a malingerer has always an influence beyond the individual case. Shirkers from the front are prone to offer a ready-made diagnosis of night blindness, as they know that this expression connotes complete unfitness for service. Except in the case of miners, I found true night blindness, as a rule, only where there was corroborative evidence in the fundus oculi. "Nystagmus" is a very common assertion; the simulated form is recognised by the simultaneous innervation of the forehead muscles, together with increased winking. When genuine, nystagmus precludes from field service, and as there were regiments from the Rhine-Westphalian mining areas on our section of the front, these cases became more numerous. Here experience with soldiers returning from the front shows that even low grades of miners' nystagmus, only elicited by raising the eyes, and not present on steady fixation, nevertheless produce unfitness, even for trench warfare.

The decision is complicated by the question of injury received on war service. Naturally those cases become more numerous in which congenital defects or previously acquired diseases are represented as having arisen in war, or in which, even without such a basis, the assertion of sudden blindness is made. In cases of the first class the *bona-fides* should never be doubted; a mistaken view is often adopted as to the cause of an accidentally discovered, and hitherto unnoticed, unilateral visual defect. In cases of the second class the question arises in all its seriousness and with all its difficulties, as to whether the condition is simulated or functional, whether the blindness is feigned or really exists in the imagination of the wounded man. We must meet those who have fought and really suffered for the Fatherland without prejudice, and must bear in mind that no successful test can differentiate between malingering and a functional affection. We have, however, a factor of differential diagnostic value, namely, the success of suggestive treatment. As far as concerns the single isolated symptom of unilateral blindness, it will be possible by suitable methods to break down the psychical inhibition and to restore perception, it may be step by step, it may be at one bound. By this is not meant a cure of the neurosis but removal of this single symptom. Indeed, recovery occurs only when the true nature of the symptom has been recognised, while the harm which results from its misinterpretation is difficult to neutralise in later stages whether the error has been in the one or the other direction, that is, a psychical disturbance may be regarded as simulation, this impression being expressed in the attitude of the surgeon, or it may be regarded as organic and arrangements made for compensation possibly for complete loss of an eye. Errors in the latter direction are certainly more seldom, although still possible. Neither psychical nor simulated disturbances of vision are found in perfectly healthy eyes, but in those showing real, although possibly slight, pathological manifestations, which do not adequately account for the state of the vision. It is of the greatest importance that the patients should pass into the hands of those who have experience as specialists while the objective condition is still fresh, and before the subjective symptoms have become too firmly fixed as a result of a mistaken decision in one direction or the other. The original cause may be of the most varied nature ; anything from an insignificant macula resulting from a healed corneal injury to a really extensive vitreous hæmorrhage may be invoked as the cause of total loss of light perception. It is always important that the difference between the objective and subjective findings should be ascertained.

As the original objective factor may vary from a remote to an almost adequate explanation of the subjective condition, so there are grades and stages between simple malingering and those cases in which, while a certain degree of intention comes into play, other controlling ideas, more or less firmly fixed, are active at the same time, based partly on inclination but more often on fear. Injuries in the neighbourhood of the eye or in the brain may cause visual disturbance or photopsia, and the loss of one eye causes disturbances in the other. My special clinical material shows that in relation to such functional defects, which are based on auto-suggestion (Charcot), true traumatic neurosis (Oppenheim) is more rarely found. The molecular damage to the brain, which forms the basis of traumatic neurosis, will become manifest in general disturbances of the nervous system which come under the notice of neurologists ; thus, one-sided blindness in no way belongs to the symptomatology of traumatic neurosis, and I do not class the cases which I have observed under that head.

I can bring forward typical examples of all forms of visual disturbance not dependent on organic disease. Cases of sudden blindness without objective findings following bomb explosions, presumably immediately before the eyes, are usually simulated. Here the professed cause is so easy to invent and so difficult to confirm, that, when unsupported by other evidence, it should be regarded with suspicion. Somewhat different is the case of a non-commissioned officer, one of whose eyes I had removed and to whom I was called four weeks later on account of the sudden onset of blindness, with great pain, in the other eye. On arrival, I found he had been lying down, groaning dreadfully for some hours. There was total loss of perception of light, and ophthalmoscopy was accomplished with difficulty ; but at last I saw the normal disc. As the pupil reacted well, the functional nature of the blindness was evident. The patient's previous conduct offered no support for such a diagnosis ; he had taken part in fighting on both east and west fronts, and had borne the loss of his eye calmly, always repeating his desire to return to the fighting line as quickly as possible. The pain was successfully subdued by subcutaneous injections of water, and the vision was restored step by step by suggestion to half normal on the same day. He was very grateful and very intelligent, but feared a relapse. I tried to explain to him that the attack had been entirely imaginary, but he smilingly objected and insisted on believing that I had cured him of a serious illness. Further observations of this patient showed no signs of hysteria. This case proves that a war accident may produce in a *normal* individual a symptom characteristic, not of traumatic neurosis, but of hysteria. In another case functional one-sided blindness occurred in connection with a bullet wound of the frontal lobes of the brain, which produced no other cerebral symptoms. Such a severe brain injury would incline one to attribute the blindness to molecular damage of the cerebral tissue, if it did not seem questionable to explain this particular symptom of one-sided blindness in this way. On the other hand, in the case of a lieutenant, referred from a neurological station, I was able to make an observation throwing some light on this point, and showing the close relationship between molecular brain injuries and those which are regarded as organic. In this case the clinical picture of true traumatic neurosis developed following a bomb explosion, which produced no external injury. There was no unilaterial blindness, but typical bilateral hemianopsia was present, with a sharply-defined vertical boundary, quite impossible for a layman to have invented. The hemianopsia was very inconstant, oscillating from left to right, and disappeared after a few days. There was no history of migraine. Genuine attemps at malingering, which in the nature of things are often encountered, and most frequently by eye surgeons, should not be allowed to mislead us into general conclusions, and still less should we contribute to the spread of ideas, based on such unjustified generalisations, beyond our own sphere. The complete picture which impresses itself on every military surgeon is that of undiminished joy in battle and most earnest consciousness of duty.

The treatment of eye affections offers fewer points of interest requiring special war experience than the question of deciding as to vision. The same conditions which we meet with otherwise occur in about the same percentage. Iritis is fairly frequent, while retinitis and optic neuritis, without any systemic causal condition, and detachment, without injury or myopia, are not uncommon. A difficult problem, in the East at any rate, is that of trachoma which entails unfitness for military service. While, therefore, we are entitled to exclude without exception all cases of trachoma, there are thousands of men whose eyes show only the tell-tale scars which determine the diagnosis, and who are otherwise fully fit for service. Without too highly estimating the infectiousness of such old trachoma, it is well to remember that the conditions at the front facilitate its diffusion. I have seen a considerable number of fresh cases, not only from the front, but also among the civil population amongst whom soldiers had been billeted.

The relative number of wounds of the eye to cases of disease depends on the amount of fighting going on. It may be supposed that when such a delicate organ as the eye is wounded it is destroyed, and only the sad task of enucleation remains. This is no doubt one reason why the need for ophthalmic surgeons was at first considered to be slight. It must be pointed out that these enucleations are nearly always very difficult ; the globes are mostly collapsed and severely mangled, and shreds may have become adherent to the conjunctiva of the upper or under lid. The globe must be carefully dissected out, leaving as large a conjunctival sac as possible. Many cases which I have seen will never be able to wear an artificial eye, and as these enucleations are seldom very urgent, they should be passed on to the better-equipped eye stations. Enucleation must often be combined with repair of the eyelids, which, when carried out early enough, produces a gratifying result. In other parts, better aseptic conditions may be obtained by waiting. The tissues of the lids and conjunctiva, however, are not so apt to give trouble in this respect, but are liable to cicatricial contraction, elsewhere not of great consequence, which is disfiguring and prevents the wearing of a prothesis. Every millimeter of conjunctiva must be regarded as something precious, every millimeter of lid-edge as something irreplaceable. When healing is complete, it is only possible to produce slight alterations by laborious transplantation, whereas surprising results may be achieved in fresh cases.

Injuries calling for conservative measures, are less common. Relatively frequent amongst these is prolapse of iris with or without cataract. As the eyeball is the organ in the whole human body which is perhaps most liable to infection, the warning of all experienced military surgeons, to interfere as little as possible with the wound, is of importance. An extensive prolapse should be excised, but nothing should be replaced in the anterior chamber with the repositor. Corneal defects with loss of tissue are frequent, and require covering with conjunctiva. Cases requiring the sideroscope and the magnet are not so common as is supposed, and the two which I met with did not suffer on account of the journey to a University clinic.

The number of vitreous hæmorrhages without injury of the coats of the eye is fairly large. There is often associated loss of light perception and little tendency towards resorption. The use of atropin is here especially injurious, as it presses the blood out of the nearly always hyperæmic iris into the ciliary body, and leads to subsequent hæmorrhage from this into the vitreous. In one case in which the bleeding had continued for several days, a rapid clearing of the vitreous, with a corresponding improvement in vision, occurred on the same day after using eserin in large doses, and I have no doubt as to the connection in this case between the causation and my therapeutic measures.

This review of the special war experiences of an ophthalmic surgeon shows at the same time the need for an extensive enrolment of eye surgeons, which, indeed, has taken place more and more during the course of the war.

H. M. TRAQUAIR.

CURRENT LITERATURE.

NOTE. Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—CORTICAL REPRESENTATION.

Lister, W. T. and Holmes, Gordon.—Disturbances of vision from cerebral lesions with special reference to the cortical representation of the macula. *Proceedings Royal Society of Medicine, Section of Ophthalmology*, June 1916.

The paper by **Lister** and **Holmes**, of London, is of extreme interest and novelty. The experience of the authors in France is an experience which later, doubtless, will be collated with that of others working in the same field, and will lead to more precise knowledge of the cortical representation of the retina than has been possible hitherto.

The authors point out that most of their observations were necessarily made at a relatively early date after the infliction of the wound, at a time when the effects of shock were still present, and that it may be objected that the defects described may have been due to functional disturbances rather than to local injuries of the corresponding cortical areas of their centripetal fibres. Nevertheless, if it can be shown that there is a constant relation between the probable site of the injury and the form of the visual defect, certain general conclusions will be justifiable.

It is clear, one cannot help thinking, from the excellent charts, and the plans of the head showing the positions of the wounds of entrance and exit in nearly every case, that the authors do justify their conclusions; and if, as several members suggested in the course of the discussion, surgeons at home will take every opportunity to study and follow up these cases at the later date when possible shock effects have passed off, great advantage is likely to accrue to the general stock of knowledge.

A point which has emerged from the conditions under which the authors have worked is the difficulty of trustworthy perimetrical observations. As most patients were confined to bed, a small hand perimeter had to be employed in most cases, but for the investigation of the exact relations of smaller defects the authors employed an ingenious modification of Bjerrum's screen, a description of which may be useful to others.

"A large sheet of paper (double foolscap) covered with black cloth, is placed on a flat board and both are pinned to it. A small drawing pin serves as a fixation point. The test object is carried on the blunt end of a steel pin, about $\frac{1}{2}$ cm. in length, which is fixed transversely across the end of a dark metal bar, so that its point projects about 1 mm. on the opposite side. The test object thus fixed on the end of the rod is moved slowly from the blind region along the screen until the patient sees it; then the carrier is simply pressed against the board so that the point of the pin penetrates the cloth and marks the paper beneath it. A large number of observations are taken. If the distance of the point fixed from the eye is known—we generally use it at a distance of 1 metre – the record thus obtained can be transferred to an ordinary or to a special perimeter chart."

Before commencing a description of their cases the authors make comment upon the various opinions which have been held regarding cortical representation of the macula. The escape of the macula in most cases of hemianopia of vascular origin has led to the view that the macular area is represented in both hemispheres. This view was confuted by the fact that central vision may persist in bilateral hemianopia due to lesions of both occipital lobes. Thereafter von Monakow supposed that the macular centre must lie outside the area striata, or may not be locally represented in the cortex. And there have been other hypotheses. Within recent years Henschen, Bolton, and Inouye—the last from observations made during the Russo-Japanese War—have endeavoured to determine a localized macular centre in the cortex. Henschen placed it in the anterior portion of the calcarine cortex, while the evidence of Inouye places it towards the pole of the occipital lobe.

The cases detailed by Lister and Holmes are grouped under "Quadrantic Defect," "Central Scotomata," "Homonymous Hemianopia with Central Scotoma," "Paracentral Scotomata," and one case of "Telescopic Vision." These cases are all interesting and are all described and illustrated in a manner that leaves nothing to be desired. Most especially worthy of remark is the fact that, although there is a score of cases, practically every case is illustrated on the same page as that containing the bulk of the description.

It would be futile to attempt a summary of the cases. The authors' conclusions, which they say cannot be regarded as final, are as follows:—

(1) The upper half of each retina is represented in the dorsal, and the lower in the central, part of each visual area.

(2) The centre for macular or central vision lies in the posterior extremities of the visual areas, probably on the margins and the lateral surfaces of the occipital poles.

(3) That portion of each upper quadrant of the retina in the immediate neighbourhood of, and including the adjacent part of, the fovea centralis is represented in the upper and posterior part of the visual area in the hemisphere of the same side, and *vice versâ*.

(4) The centre for vision subserved by the periphery of the retinæ is probably situated in the anterior end of the visual area, and the serial concentric zones of the retina from the macula to the periphery are probably represented in this order from behind forwards in the visual area.

In order to make conclusion number three perfectly clear as regards the author's meaning, it may be well to quote textually what they say on this subject, on a previous page.

"It might, perhaps, still be argued that the evidence is not sufficient to conclude that central vision, that is, that subserved by the fovea centralis, has not a double representation in the cortex, as certain of our fields may show that the blindness, whether in the form of a scotoma or of hemianopia, did not extend up to the fixation point; but we have found that the more exact the methods we employed, and the greater the care taken in making the observations, the nearer did the loss approach the fixation point. We consequently believe that, in common with every other part of the retina, the macula is not represented bilaterally."

The authors, while their paper was in preparation, received the "valuable and elaborate contribution" of MM. Marie and Chatelin to the same subject (*Rev. Neurol.*, 1914-15, T. XXVIII, p. 882). They state that their own and the work of Marie and Chatelin seem to be mutually confirmatory. ERNEST THOMSON.

II.—STUDIES OF THE BLIND-SPOT.

Peter, Luther C.—Perimetric studies of the normal and pathologic blind-spot of Mariotte. *Annals of Ophthalmology*, April, 1916.

Peter, of Philadelphia, is already well known for his studies in perimetry, and the present paper will therefore be sure of a good reception. From a large number of observations he has found that the blind-spot is 7° 40′ in the vertical, and 5° 28′ in the horizontal diameter; the distance from the fixation spot to the centre of the blind-spot is 15° 49′. He gives the corresponding measurements in mm., according as the surgeon works at 33 cm., at 1 m., or at 2 m. He discusses the physiological variations of the blind-spot, as well as those due to errors in method. His observations on enlargements of the blind-spot are of special interest, but, to the reviewer's mind, they would be more likely to be helpful to many readers, if the ideas of the optic disc and of the blind-spot were kept more clearly separated. Peter speaks of "an enlargement on the nasal side of the disc." What the reviewer gathers he means is an enlargement of the blind-spot (on its temporal side in the field of vision) due to some disturbance of the retinal elements on the nasal side of the disc. This slight ambiguity in the use of terms is inclined to confuse the reader, and is the more to be regretted as the value and originality of the remarks made are considerable, and as there is obviously no confusion whatever in the writer's mind.

Peter is a strong believer in the study of the blind-spot at a close range, especially when taking colour fields, and he makes out a strong case for the methods he advocates. There can be little doubt that his writings will exert a very considerable influence on the minds of ophthalmologists, and that the procedure he recommends will be given a full and fair trial. The clear and forcible way in which he puts his points will secure him an attentive hearing.

He does not share the prevailing belief that around the normal blind-spot there is an area in which there is a qualitative colour change; indeed, he thinks that this idea is an error founded on badly devised perimetric methods. When, however, the optic nerve becomes the seat of disease, the first evidence obtainable is a qualitative loss of colour around the blind-spot, the second a quantitative loss, and the third and final an absolute enlargement of the spot.

Peter next discusses the very interesting, but still too little understood, question of the arrangement of the nerve fibres in the optic nerve. He is of opinion that clinical data would seem to locate the temporal fibres of the retina in the temporal part of the nerve, and those of other parts of the retina in corresponding and definite parts of the nerve, even as far back as, or farther back than, the chiasm. It is probable, therefore, that in true retro-bulbar neuritis, enlargement of the blind spot is due to involvement of the nerve fibres, which supply the retina close to the disc, or to disease of the ganglionic cells, which form a part of the neuron. It is also probable that the peripapillary bundle of fibres is located in the periphery of the nerve head, but their course in the remaining portion of the nerve is more or less in doubt. The view, which Peter here adopts, as to the location of the peripapillary nerve fibres, whilst still in the nerve head, is that most widely adopted by ophthalmologists, and is in direct contradiction to the current explanation of the contraction of the peripheral field in glaucoma. This is a matter of some interest.

In Peter's opinion, most enlargements of the blind-spot are due to intraocular changes surrounding the optic disc. Such changes may be degenerative (following inflammation), œdematous, traumatic, or atrophic. A number of different conditions are taken up in turn. In colobomata of the disc, the enlargements of the blind-spot are usually absolute both for form and for colour. Opaque nerve fibres, on the other hand, rarely produce enlargement of the blind-spot for form, but only for colours, and merely qualitative ones at that. The changes in myopia are reviewed; their principal interest lies in the observation, that, the process being a pathologic one, an indistinct peripheral zone surrounds the enlarged blind-spot. Peter considers that enlargement of the blind-spot is of more value in accessory sinus disease than in any other condition in which it occurs; and he attributes the widespread contrary opinion to two factors:—(1) the difficulty in defining the blind-spot on an arc perimeter, as contrasted with its ease on his campimeter, and (2) the absence of the enlargement in some form of sinus disease, and in the early stages of other forms.

The blind-spot changes found in cases of chronic interstitial nephritis are those which might have been argued from the familiar clinical picture of the disease; they are merely the evidence the perimeter yields of "the neuro-retinitis and œdema around the disc which accompany alluminuric retinitis." They, however, present this advantage to the diagnostician, that they enable him to recognise, or at least to suspect, renal disease at an even earlier stage than the use of the ophthalmoscope alone does. With regard to affections of the choroid and retina, a disease of pure nerve elements, as in optic neuritis and in retinitis, produces changes in the blind spot area which are in keeping with those which are observed in the peripheral field in chorio-retinal disease. In injuries to the globe, the line of fracture usually starts at and extends from the optic disc. When the violence applied is not sufficient to produce actual rupture, it may yet be traced by the perimeter in an increase of the size of the blind spot.

The paper is one which every one interested in perimetry should read attentively. Its closing word must be taken to heart by those who would wish to imitate Peter in his results as well as in his methods. "Earth has her price for what Earth gives in perimetry. Patience and accuracy are correlated."

R. H. ELLIOT.

III. TETANUS DUE TO WOUNDS OF THE EYE.

(1) Goetz, R.—The treatment of tetanus secondary to orbito-ocular wounds. (Traitement du tétanos secondaire aux traumatismes orbito-oculaires.) *La Clinique Ophtalmologique*, avril, 1916.

(2) Schneider, Elis R.—Tetanus consecutive to ocular lesions. (Le tétanos consecutif aux lésions oculaires.) *Annales d'Oculistique* septembre, 1916.

(1) This article is an extract from a *Thèse ae Lyon*, by **Goetz**.

So far as the extract itself is concerned, it deals only to a small extent with orbito-ocular infection by the tetanus organism. Mainly, it is concerned with the details of the treatment, preventive and otherwise, of tetanus in general.

Appended to the extract are nine conclusions which appear to be the conclusions drawn by the author from his whole work and not merely the conclusions drawn from the extract.

These conclusions may be here stated—

1. Cephalic tetanus secondary to wounds of the orbito-ocular region is relatively rare. We are, however, able to report fifty observations.
2. The points of entry of the bacillus are, in order of frequency, the eyeball, the orbit, the eyebrows, the upper lid, the lower lid, and, rarely, the conjunctiva.
3. The cornea has been the point of entry in our cases. The fact is very interesting because, in the normal state, the cornea, while containing no blood-vessels, has numerous nerve plexuses. The tetanus poison can thus diffuse very rapidly.
4. Infection is almost invariably due to wounds by earth or by equine dejecta. They are rarely of operative origin.
5. Tetanus, secondary to orbito-ocular injuries, presents three varieties of symptoms (*a*) trismus, (*b*) facial paralysis, (*c*) eye troubles, chiefly paralysis or contractures of the ocular muscles.
6. The prognosis as to life of cephalic tetanus of orbito-ocular origin is more serious than that of general tetanus.
7. Cephalic tetanus of orbito-ocular origin is serious in proportion to (*a*) the rapidity of onset, (*b*) the depth and degree of contamination of the wound, (*c*) the length of time during which the foreign body has remained in the wound, and (*d*) the lateness of the commencement of prophylactic injection of serum.
8. Tetanus being an infective disease, the treatment is two-fold: (*a*) to remove the focus of infection, (*b*) to employ serum therapy in accordance with rational *technique*.
9. The best results are obtained by intravenous and sub-arachnoid injection of anti-tetanic serum.

ERNEST THOMSON.

(2) **Schneider**, of Copenhagen, remarks that cases of tetanus after injuries to the eye are exceedingly rare. For example, he estimates that some sixty cases have been observed during the period between 1816—1916.

The author now details a couple of cases, the first reported from the clinic of Professor Edmund, and the second personally observed in the service of Professor Tscherning at the *Rigshospitalet* at Copenhagen. The facts follow:

[illegible] clinic, was found to have an inflamed wound of the left upper eyelid, accompanied with general feverishness. Nine days after the injury, the boy had difficulty in opening the mouth, although no contraction of the masseter muscles was present. There was thought to be paralysis of the left facial nerve, but diagnosis was rendered difficult on account of swelling of the soft parts of the face. On the following day, the temperature was normal. Trismus was present, the masseters were contracted, and the eyes could not be opened. As tetanus was suspected, antitoxin was injected into the veins, twenty-five centigrammes of chloral were administered four times a day, and rectal feeding was carried out. Contractions of the muscles of the neck, the abdomen, and the extremities came on, and there could no longer be doubt as to the presence of the left facial paralysis. Further injections of serum (intravenous, intra-muscular, and subcutaneous) were given. The condition fluctuated, but the lad was discharged as cured in something less than two months after the original injury. No bacteriological examination was made.

2. A coachman, aged 36 years, had been struck with a whip in the eye at least a fortnight before he was first seen by Tscherning, when he complained of anorexia, and was unable to open the mouth. The injury had ruptured the cornea, and led to a hernia of the iris. When admitted, the eye was in a state of panophthalmitis. The left facial nerve appeared to be paralysed, but the diagnosis was rendered somewhat uncertain, owing to the swelling of the cheek. The patient could not separate the teeth. There was neither rigidity of the neck nor convulsions. The trismus was regarded as consecutive to the inflammation of the eye. Two incisions into the orbit failed to liberate pus, and the eyeball was then exenterated, but no foreign body was found. On the following day, T. 38.1° — 37·9° C. The trismus was more pronounced, and paralysis of the left facial nerve was more marked. There were several attacks of suffocation, during which the patient became cyanotic and unconscious. The attacks were sometimes accompanied by convulsions of the extremities. An intra-spinal injection of anti-tetanic serum was given, and chloral, one gramme three times in the day, was administered by the rectum. On the next day, T. 38·3° — 39·3°C. The trismus persisted, but there were no convulsions. A second injection of serum was given, and the dose of chloral was increased by one gramme. On the following day, that is to say, about the seventeenth day after the injury, the patient was feeble, cyanotic, and soaked in perspiration. T. 39.7°—40°C. There were several attacks of convulsions. The man died that evening.

At the autopsy, a slight infiltration of the retro-bulbar tissues was found. No foreign body. Mitral endocarditis. No bacteriological examination was made.

The earliest symptoms of cephalic tetanus are trismus, difficulty in deglutition, and paralysis of the VII cranial nerves. An early diagnosis appears to be seldom made by the ophthalmic surgeon, mainly owing to the rarity of the disease in his work. It is seldom recognised by him until the onset of convulsions. The facial paralysis is obscured by swelling of the cheek, and the trismus is accounted for on similar grounds, or is put down to an infiltration of the muscles of mastication. In Vinsonneau's case, indeed, the trismus was believed to be due to the employment of a mouth gag in the course of general anæsthesia.

In general, the causative lesion of cephalic tetanus involves the adnexa and not the eyeball itself. Amongst the cases put down to wounds of the eye itself, Schneider excludes those of Samelsohn, Hulke, Chisolm, and Wicherkiewicz, and gives his grounds for doing so. Putting these doubtful cases aside, Schneider now adduces particulars of nineteen cases where he considers the eyeball itself was the point of entrance of the infection. Of these it may be noted that nine were due to lesions inflicted by a blow from a whip, thus bearing out the old view that individuals having to do with horses are particularly exposed to tetanus. Of the nineteen cases, four followed operations upon the eye (enucleation, reclination, and the introduction of Scarpa's *clou*). In two of the cases the origin was from shot wounds, and in one from a wound by a rocket.

The evolution of the infection is almost always the same. Some days after the lesion, trismus, difficulty of deglutition, and facial paralysis are observed, to be shortly followed by the symptoms of general tetanus. In two of the cases facial paralysis was the symptom first noticed, but it is usually preceded by trismus. True paralysis of the ocular muscles has been seen in four or five of the cases, but it must not be forgotten that the affected eye is often rendered immobile by reason of panophthalmitis.

Most authors regard the prognosis of tetanus originating from a wound of the eye as particularly bad. Of the nineteen cases collected by Schneider, three only recovered, but (as he points out) the numbers are too small to draw any general conclusion from them. In fifteen cases where the necessary information was forthcoming, the period of incubation fell short of ten days, a fact that seems to Schneider to bear out Oeller's view, namely, that the prognosis of the affection is not specially unfavourable.

The treatment does not differ from that of ordinary tetanus. Cases have been published by Wirtz, Jess, and Vossius where prophylactic injections of anti-tetanic serum were made because Nicolaier's bacilli were found in the secretions from the wounds, and tetanus did not supervene in these cases. Owing to paucity of material, we are yet unable to decide whether the injections are useful once the disease has declared itself.

As regards surgical intervention, Schneider agrees with Mayweg in thinking that enucleation should not be undertaken with a view to preventing tetanus. If there be reason to suspect infection, the proper course is to inject serum, and to make an attempt to keep the wounded eye, at least if there is any chance of saving a little sight. Tetanus once declared, removal of the eye is scarcely to be thought of. Commencing panophthalmitis is an indication for surgical interference. Under these circumstances should we enucleate or exenterate? In seven cases where the former operation was done, all the patients died, while of three patients where the latter was performed, two survived. In undertaking enucleation in such cases there is the additional risk of setting up meningitis.

The communication ends with a list of forty-one references, of which five only refer to British or American cases. SYDNEY STEPHENSON.

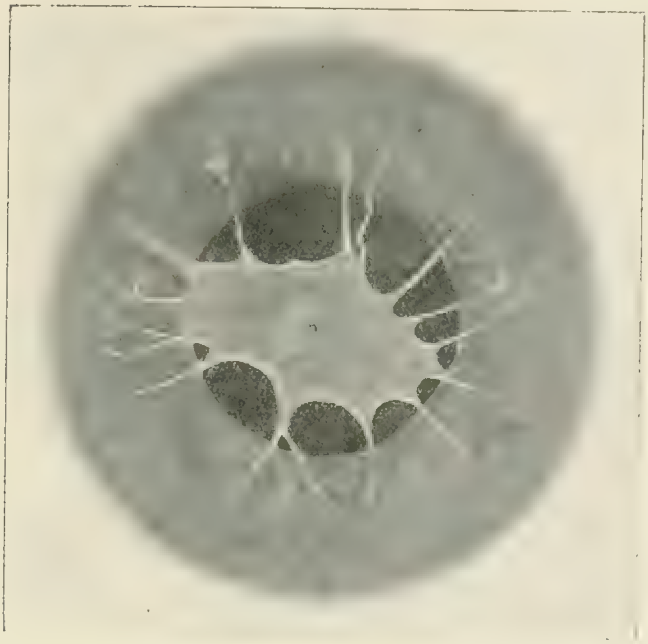
IV.—PERSISTENT PUPILLARY MEMBRANE.

Terrien, F. and Mawas, J.—The extraction of persistent pupillary membranes: technic and results. (L'extraction des membranes pupillaires persistantes: technique et résultats.) (*Archives d'Ophtalmologie*, juillet-août, 1910.

Terrien and **Mawas,** of Paris, report and figure one of those very rare cases where a congenital pupillary membrane was of such dimensions as to reduce sight to between 1/10 and 1/15. The condition, which was roughly symmetrical as regards the two eyes, was treated surgically, and in the result normal vision was obtained.

In order to follow the method of operation adopted by the authors, it should be explained that the membrane, which was not adherent to the anterior capsule of the lens, obstructed the entire pupillary aperture when the pupil was in a state of medium contraction, and was attached to the lesser circle of the iris by a number of fine strands, forming, as it were, so many tendons of insertion, of which some were simple and others ramified (*see* figures). There were in the right eye twenty-one of these strands, and in the left eye fifteen. It is of interest to note that during contraction of the pupil, the strands became relaxed, and allowed the membrane to be displaced forwards towards the cornea, much as a sail might be bellied forward by the wind.

The operation, performed under the influence of 4 per cent. cocaine, was as follows.—An extremely narrow blade, with its cutting edge directed downwards, was passed into the anterior chamber, without allowing the aqueous to escape, through the outer end of the horizontal meridian of the



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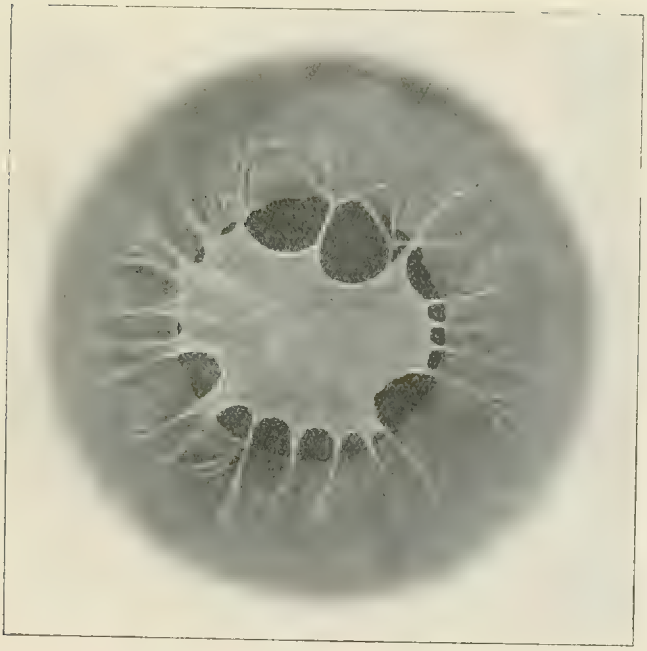

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right cornea. The tendons of insertion were then divided as regards the lower half of the membrane by steady sawing movements of the blade. As the strands were cut through, the membrane became retracted upwards, revealing a beautiful black pupil. After waiting for about half an hour, during which period the anterior chamber was re-formed, the knife was introduced through the puncture first made, but on this occasion its cutting edge was directed upwards. The attachments of the upper half of the membrane were then divided, the blade being passed for the purpose between the membrane and the anterior surface of the iris. Finally, a section was made at the limbus (the original aperture being utilized for the purpose), and the membrane was removed from the anterior chamber by the aid of iris forceps. Eserine was dropped into the eye, and an occlusive bandage applied. Prior to the operation, the surgeon took the precaution of rendering himself artificially myopic by wearing *plus* 4 D. spherical lenses.

Sight was not sensibly improved during the first few days, but betterment was noticed on the fifth day after operation, and on the twenty-fifth day it had become normal. This was thought to be due to a progressive education of the macula. The authors regard the V. of 1/10 to 1/15 before operation as extra-macular, and obtained by slightly inclining the head.

The second eye was operated upon in a similar way, but it was proposed to allow several days to elapse between the two steps of the operation instead of merely half an hour. In point of fact, the second part of the former operation had presented some difficulties on account of the hypotony present, and it was thought that by this modification this might be avoided. But the operation was not completed, due to circumstances over which the authors had no control.

SYDNEY STEPHENSON.

OPERATIONS.

26.—Glaucoma.

1. Prince, A. E. Report on a gold mule-shoe drain for chronic glaucoma. New method to avoid usually employed flap. (*Trans. of the Ophth. Congress*, 1915, p. [illegible], and *Annals of Ophthalmology*, Vol. XXV, No. 1, January, 1916.

2. Woodruff, H. W.—Trephining *versus* iridectomy in glaucoma. (*Trans. of the Ophth. Congress*, 1915, p. [illegible], and *Annals of Ophthalmology*, Vol. XXV, No. 1, January, 1916.

3. Varela, Santos. A slight modification of the operation of Dupuy Dutemps for chronic glaucoma. (Ligera modificacion a la tecnica de Dupuy Dutemps.) *España Oftalmologia*, February, 1916.

4. Doniec, Theodore. Cases of severe irido choroiditis of glaucomatous type. Sclerectomy iridectomy. (Irido-choroidites graves a forme glaucomateuse. Sclérecto iridectomie.) *La Clinique Ophtalmologique*, [illegible] 10 juillet, 1914.

5. Wilmer, W. H.—Three years experience in sclero corneal trephining in glaucoma. *Archives of Ophthalmology*, July, [illegible].

(6) **Ruiz, Rodolfo del Castillo.—A new form of iridecto-sclerectomy for glaucoma. (Nuevo procedimiento de iridectoesclerectomia anti-glaucomatosa.)** *Archivos de Oftal. Hisp.-Americanos*, August, 1916.

(7) **Gifford, H.—Trephining in buphthalmos: a disappointment.** *Ophthalmic Record*, August, 1916.

(8) **Huizinga, J. G.—An improved Elliot operation for glaucoma.** *Ophthalmic Record*, August, 1916.

(1) **Prince**, of Springfield, Ill., has employed a new type of drain in filtration operations, substituting a ring of 24 carat gold for the threads employed by other operators. The ring is 2½ mm. in diameter, and is made of wire of a thickness of 1/100 of an inch. The end of this is bent into a toe, 1½ mm. long, which is placed in the trephine opening with the object of keeping it open. Prince performs iridectomy in acute and sub-acute glaucoma, and sclero-corneal trephining in chronic cases, but he finds that a number of the trephine cases sooner or later fail to drain. Like many other surgeons, he is opposed to the use of thread, on account of the danger of infection, hence he was led to employ the gold drain. He makes an incision exactly like that used in the newer Elliot flap, and appears to be unaware that this is not an innovation. He introduces the gold drain after suturing up the flap. He claims that it will prevent the lips of the wound from adhering, but does not give the ground for this opinion. It is difficult to understand why it should be expected that the introduction of a piece of wire into the wound should keep it open. "Trephine wounds close, not because nature abhors a vacuum, but because a proliferation of new-formed connective tissue from the edges, from the depth, or from the surface of the wound, serves to close in the artificial opening made. Under these circumstances, it is difficult to believe that the introduction of a piece of wire would have any effect whatever. Where the original operation has been aseptically made, there is no reason why the wire should spoil a good result. But under such conditions, the metal drain might unfairly claim, and be awarded, the credit rightly due to the simple filtration operation. R. H. ELLIOT.

(2) **Woodruff,** of Joliet, Ill., discusses the relative merits of de Wecker's and of Elliot's operations. He attributes the favourable reception accorded to trephining to the following causes:—

1. "It has merit; it will reduce tension where iridectomy has failed or would fail; 2. it is technically not a difficult operation to perform; and 3. Colonel Elliot, himself, an operator of large experience, personally demonstrated it in several of our large cities, and before our Ophthalmic Societies, in 1913."

If the Elliot operation were devoid of danger, its universal adoption might be recommended, for it is effective in lowering the tension, but against it he places the danger of late infection. He comments on the fact that some operators of large experience have not met with this complication, while others have, and reminds his readers that they are comparing a comparatively new operation with one that has passed its jubilee. He notes particularly that the trephining operation includes a small peripheral iridectomy, and appears to doubt Elliot's contention that the only purpose of the latter is to avoid iris impaction. His two other indictments against trephining are on the score of the production of hypotony and of the occurrence of quiet iritis. His principal indictments against iridectomy are: (1) difficult *technique*; (2) production of corneal astigmatism; and (3) the failure to reduce tension. In acute and in sub-acute glaucoma, iridectomy was very successful. In simple chronic glaucoma, and in the late stages of all varieties, iridectomy has often proved a failure. The anatomical conditions present make success an impossibility. In such, Woodruff would trephine Also, where an iridectomy fails, he would advocate trephining. He quotes von Graefe's estimate of good results in 50 per cent. of iridectomies for glaucoma simplex, and points out that statistics of a number of recent writers have proved to be in harmony with those of von Graefe. In 39 of his own cases, followed over a mean period of five years, 19 remained cured and 20 failed. He is opposed to trephining in cases of annular synechiæ or of anterior synechiæ, and apparently also in certain cases of glaucoma following cataract extraction. He would narrow down the indications for Elliot's operation to cases in which iridectomy has failed, to congenital glaucomas, and to glaucoma secondary to cataract extraction, provided that in the last-named class there are no anterior synechiæ or membrane in the wound or pupillary area. He performs Elliot's operation, and is convinced that it is a procedure of great value, but he believes that each case should be taken on its own merits, using iridectomy where there is a reasonable chance of success, and resorting to the trephine only in case of necessity.

(3) The modification suggested by **Varela**, of Santiago, aims at making the conjunctival flap more easily and regularly. In the operation of Dutemps, the flap which hinges backwards, is cut with scissors, and the section is commenced in the vertical diameter of the cornea. This makes the flap a little irregular in the centre. Santos suggests that it should be cut with a knife, being at a little distance from the vertical diameter.

H. GRIMSDALE.

(4) Two cases are described by **Domec**, of Dijon, of glaucoma secondary to irido-choroiditis. In one he preferred the Elliot operation and in the other Lagrange's operation, but Domec's exact reasons for his preference of operation in each case must be read in the original. S. E.

(5) **Wilmer**, of Washington, has made several communications on the subject of sclero-corneal trephining, and his present article brings the subject up to date. He claims, with reason, that though his material is not very large, it is valuable, by reason of the fact that the cases have been under very close supervision at intervals, when the state of the tension, of the visual acuity, and of the visual fields has been recorded in each case. He gives the history of cases in which he trephined successfully for chronic glaucoma with acute exacerbation, for painful glaucoma secondary to irido cyclitis, for glaucoma following cataract extraction, and for high tension associated with staphyloma of the cornea. He also records cases in which tension returned after trephining. This occurred twice in 27 cases, both in the eyes of a single patient. A feature of great interest is that in one of these an apparently perfect drainage scar ceased to function 2¾ years after operation and called for a second operation; this was successfully performed. A rupture of the conjunctiva over a trephine opening, 8 months after operation, was met by using a sliding flap.

Wilmer says that the good results in successful cases cannot be attributed to the iridectomy alone, for among them there were five, which had undergone iridectomy, and four which had undergone Lagrange's irido-sclerectomy previous to the trephining; the last named operation procured permanent relief of tension, which the others had failed to do, in spite of the free employment of meiotics to aid their effect.

He comments on the unreliability of some of the modern models of the Schiotz tonometer, and gives in detail his *technique* for tonometry, one feature — which is that the patient should lie practically flat on the back and relax

He answers a number of the objections which have been urged against trephining, and is in favour of making the flaps as thick and protective as possible. He has had personal experience of relapses, and adds "but no procedure, surgical or unsurgical, is exempt from that calamity."

He concludes his paper as follows :—"Weighed in the balance of my own personal experience the operation of sclero-corneal trephining presents many advantages. Both eyes can be operated on at the same time, and the patient does not have to be very quiet, or very long confined. The operation can be done with ease, except in cases where the anterior chamber is abolished. It does not reduce the visual fields, therefore it can be done in those cases where the restriction is almost to the visual centre. It has not immediately reduced vision in any case, but it has improved the sight in a number of cases. It has not caused astigmatism to any accountable extent, and therefore it can safely be done, where the vision is normal, without any undue risk of immediate impairment of sight. There is only a negligible risk of the loss of vitreous, and no danger of the escape of the lens. The operation may be repeated. There is no ideal operative procedure, but in my limited experience for permanently reducing excessive tension in all cases of glaucoma, except the acute form, sclero-corneal trephining is the easiest, safest and most effective method so far presented to ophthalmic surgery."

(6) **Castillo Ruiz** recognises the great advance in the surgical treatment of glaucoma made by the ingenuity of Lagrange and Elliot, but thinks that in both these operations the dangers and difficulties are considerable. He, therefore, suggests a method which he believes will avoid many of the lions which beset the path.—He dissects down a conjunctival flap, and then makes an incision through the sclerotic by means of a keratome in the region laid bare by turning the flap down at a distance of 1½ millimetres from the limbus. The knife passes into the anterior chamber in front of the iris. He makes a large iridectomy, and then with special forceps, bites a small piece of the sclerotic out, both above and below the wound ; he then replaces the flap of conjunctiva.

This procedure is, he says, more simple and less difficult than either of the two parent operations. H. GRIMSDALE.

(7) After alluding to the poor results obtained in buphthalmos by trephining by Deutschmann, Ask, Bjerke, and Parker, who are otherwise well satisfied with the operation in chronic glaucoma, **Gifford,** of Omaha, mentions a couple of such cases, one in a lad of about five years, and the other in a woman of about thirty-five years. The author believes that on account of the enlargement of the eyeball, the conjunctiva in this condition is applied abnormally tightly to the globe. Hence, when the parts are healed, there is unusual resistance to the formation of a bleb, as well as a tendency for the conjunctiva to block the trephine aperture. He suggests that, under the circumstances, it might be advisable to place the trephine hole farther back than customary and still keep the inner side of the hole within the anterior chamber. Since in these cases the attachment of the conjunctiva to the globe is looser at the posterior margin of the limbus, this might render the operation more successful than at present appears to be the case.

SYDNEY STEPHENSON.

(8) The modified Elliot operation described by **Huizinga,** of Grand Rapids, is as follows :—

Two parallel incisions are made in the ocular conjunctiva from the limbus upward for roughly three-eighths of an inch. The bridge is dissected away from the eyeball, but its lower and upper ends are left attached. After the conjunctival bridge has been lifted away from the eyeball to one side by a squint hook, a double-edged corneal knife is employed to "slit" the cornea. The trephine is inserted slightly on the slant. The scleral button is excised, and an iridectomy is performed. SYDNEY STEPHENSON.

27.—The Eyelids.

(1) **Starr, Elmer G.—An operation for the prevention of symblepharon.** *Ophthalmic Record*, June, 1915.

(2) **Pisarello.—A note on tarsorraphy, with description of a new method. (Sulla tarsorafia con descrizione di un nuovo metodo operativo.)** *Archivio di Ottalmologia*, February, 1916, as performed by Professor Gaudenzi.

(3) **Lawson, Arnold.—Large coloboma of the upper lid; operation; result.** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, March, 1916.

(4) **Roberts, John B.—A new "muscle substitution" operation for congenital palpebral ptosis.** *Ophthalmic Record*, August, 1916.

(5) **Koster, W.—The entropion operation of du Carron du Villards. (De entropion operatie van Carron du Villards.)** *Nederlandsch Tijdschrift voor Geneeskunde*, 1916, Part I, p. 1728.

(1) **Starr**, of Buffalo, suggests an effective method for the prevention of adhesion between the eyeball and eyelid, after destructive injury to the conjunctiva by corrosive chemicals, etc. The operation consists in dividing the lower eyelid (when this is the one affected) from its margin down to the lowest portion of the *cul-de-sac*. The incision is made vertically through the centre of the lid, and involves all the structures (skin, muscle, tarsal plate, and conjunctiva). The two flaps or halves thus made are turned back and stitched, one to the side of the nose, the other to the cheek, where they are kept covered with some bland sterile dressing until the injured surfaces have been covered by new mucous membrane, when the cut edges of the lids are "freshened," and stitched together again in their normal position. The result in the majority of cases is complete restoration of the fornix and unimpaired mobility of the eyeball. By facilitating the dressing of the injured surfaces, and by keeping infectious discharges away from the cornea, it also enhances the prospect of preserving the latter. J. JAMESON EVANS.

(2) **Pisarello**, of Turin, describes a new method of tarsorraphy. It consists in splitting the lid in the required extent and to a variable depth, as in Bossalino's operation, and then inducing union of the two anterior planes of the two lids by their raw surfaces.

The operation is easy to perform and is efficacious in ensuring union. When it is desired to open the palpebral fissure again, it can easily be done by means of scissors.

The one important point in the operation is to see that no hair follicle is left in the posterior plane of the lid, or the lash will, in the process of time, grow and be turned in against the cornea.

It is strange that this method has not been suggested before, but it seems not to have been previously described. H. GRIMSDALE.

(4) In 1912, **Roberts**, of Philadelphia, suggested ("Surgery of Deformities of the Face," p. 221) an operation for ptosis based upon the myoplastic

methods employed by surgeons in traumatic and orthopædic muscular deficiences. He has now actually performed the operation, which is described below :—

The eyebrow is shaved, and an incision is carried from the root of the nose along the superciliary ridge almost to the external angle of the frontal bone (*see* figure). A vertical incision is next carried almost to the hair line upwards from the nasal extremity of the first incision. The flap thus made is turned upwards and outwards, so as to expose the occipito-frontalis muscle and tendon. In the next step, an incision down to the fascia on the upper eyelid is made just beneath the upper margin of the orbit. This flap is turned downwards, and the upper edge of the tarsal plate identified. A tunnel is then cut under the soft tissues from the lower to the upper roughly horizontal incision. A strip of muscular fibres, about a third of an inch wide and an inch and a quarter long, is cut from the belly of the occipito-frontalis immediately above the tunnel. A cross incision, made at the upper end, converted the muscular strip into a long flap. This flap is turned downwards, passed through the tunnel, and attached by three silk sutures to the upper edge of the tarsal plate. The two corner sutures are inserted as mattress stitches, in order to hold the flap superficially to the tarsal plate. Roberts next cuts on either side of the turned-down flap two strips, each half the width of the inverted flap, having their only attachment to the muscle above. These are drawn towards the fold of the inverted flap, attached to it on its superficial surface (once the under surface) by a mattress suture at each edge,

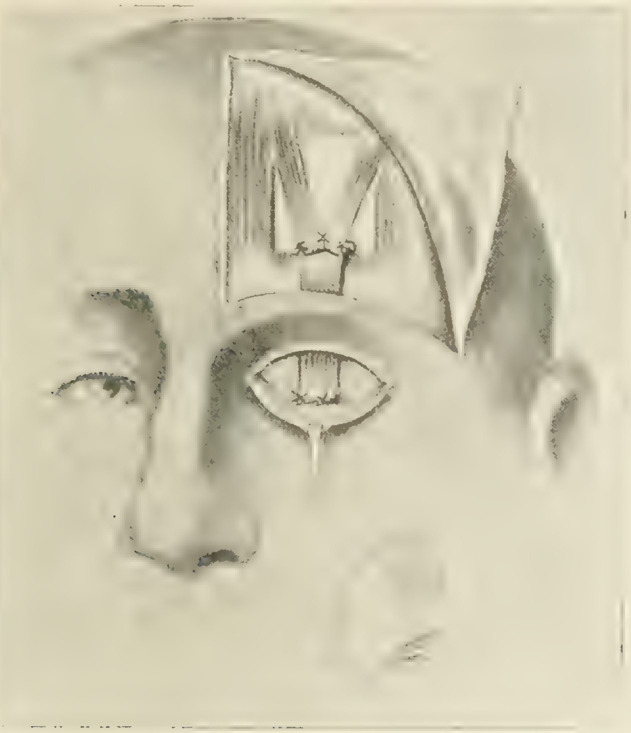

Diagram of Roberts's "muscle substitution" operation for congenital ptosis by transferring fibres of occipito-frontalis. Small diagram shows method if flap turned downwards and outwards instead of upwards and outwards.

and united in the middle line by a third suture, also put through the turned-over portion of flap, so as to make a mattress suture. An additional suture is inserted at one edge where the first flap was bent over, with the object of keeping it folded. In the last step the superficial skin flap of the forehead is sutured into position by wormgut stitches. SYDNEY STEPHENSON.

(3) As shown by the accompanying figures, **Lawson**, of London, obtained a brilliant result from the surgical treatment of a large coloboma of the upper lid in a male child, aged eight months.

The first figure, made when the child was asleep, shows the extensive nature of the deformity. The cornea fits into the coloboma gap something like a picture into its frame, an appearance probably due to defect in the action of the superior rectus muscle. The edges of the coloboma were pared in the usual way, and a good approximation of the edges was effected by the introduction of a first set of sutures. Then, the parts being held more or less in position by the first set, a second set was inserted still further to improve matters. The remainder of the parts were secured by fastening the lids together by a couple of sutures, one on each side of the wound, and both eyes were kept bandaged. The second figure, also taken during sleep, six months after the operation, shows the result. SYDNEY STEPHENSON.

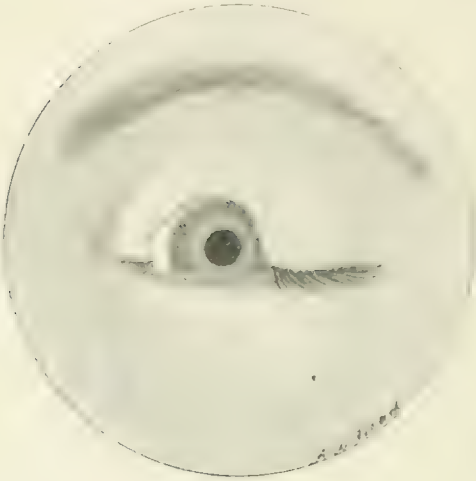

Fig. 1

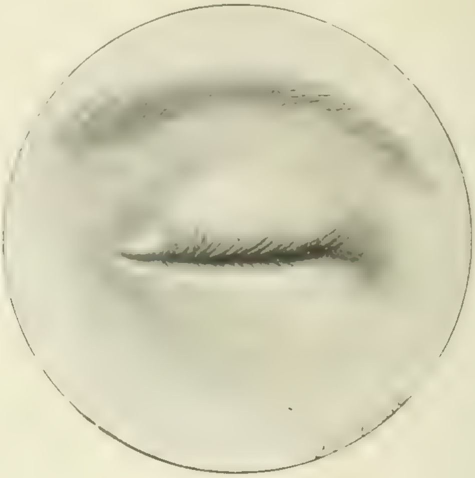

Fig. 2

(5) **Koster,** having observed that the usual operation for senile entropion, the excision of a horizontal flap of skin and muscle from the lower lid, often fails to bring lasting relief, considered that the result would be better if the tension of the lower lid could be augmented. This can be brought about by making three vertical oval-shaped excisions from the lid and muscle. When the wounds are sutured, the eyelid appears much stiffened. The result is excellent and lasting. The method is an old one, first described by Carron du Villards. G. F. ROCHAT.

BOOK NOTICES.

The Ophthalmic Year Book. Volume XII, containing a digest of the literature of ophthalmology for the year 1915. Edited by EDWARD JACKSON, M.D., Sc.D. Illustrated. Herrick Book and Stationery Company, Denver, Colorado. 1916.

A cordial welcome to the *Ophthalmic Year Book* for 1915. Dr. Jackson has been assisted in his work by eighteen department editors, all of them of American nationality with the exception of Colonel R. H. Elliot, who writes, as is fitting, on glaucoma. The somewhat diminished size of the present volume is due to the influence of the war in reducing the literary output. The greatest falling off has been in France, Germany, and Austria. The publication of British and Italian journals has become more irregular. There is, on the other hand, an increase in the importance of Spanish literature, as well as some growth in the original articles published in the United States. Almost all the ophthalmic journals, however, show a shrinkage of their abstract and review departments. With regard to the large number of papers on war injuries, it is remarked that the scientific value of the increase is not proportioned to its amount. "There are many crude observations and repetitions, and there has been little thorough study of the facts thus placed on record. The really valuable facts that are to be learned from this literature are yet to be elaborated and emphasized." SYDNEY STEPHENSON.

Transactions of the American Ophthalmological Society. Vol. XIV, Part II. 1916. Philadelphia: Press of Wm. F. Fell Co.

This paper-backed illustrated volume of 388 pages represents the proceedings of the fifty-second annual meeting of the Society held in May last at Washington, D.C. It has been issued with creditable promptitude. It has heretofore been the custom to publish the *Transactions* in parts, the issues for three years forming the completed volume. We note with approbation, however, that in future the less cumbrous plan will be adopted of publishing the *Transactions* as a separate volume, bound in cloth, one for each year. This plan will doubtless facilitate ready reference. The present volume opens with illustrated notices of Benjamin Joy Jeffries (Boston), Benjamin L. Millikin (Cleveland), and Charles Heady Beard (Chicago), three members of the Society who have died during the year. The demise of Edmund C. Rivers, of Denver, is also mentioned.

The volume includes thirty-eight scientific communications, which will be noticed in abstract form in due course in our columns.

SYDNEY STEPHENSON.

London County Council. Annual Report of the Council, 1914. Public Health. P. S. KING & SON, Ltd., 2 and 4, Great Smith Street, Victoria Street, Westminster, S.W. 1916. Price 2s. 6d.; post free, 2s. 11d.

It would be strange indeed if this Public Health Report of the London County Council did not contain something of interest to the ophthalmic surgeon.

The only pity is that the absence of an index (there is a table of contents) makes it difficult to find what one is looking for. Take, for instance, the subject of ophthalmia neonatorum, which does not figure as such in the table of contents, but under the heading of "Midwives' Act," of which the County Council is the administrative authority.

During the year under review, 488 notices were received from midwives of ophthalmia in infants, while 527 cases were investigated by the Midwives' Act Committee of the Council. As regards the latter, 456 cases were reported as cured; 20 died while still suffering from the disease; in 6 impairment of vision resulted; in 53 the result could not be traced; and 2 still remained under treatment at the time of the Report. Of the 6 cases where damage to vision supervened, in 4 there was a history of vaginal discharge in the mother. In 1 the malady came on on the day of birth; in 1 on the seventh day; in 1 on the eleventh day; and in 3 on the fifth day. As regards the 537 cases, it is of interest to quote the day of onset of the disease.—Day of confinement, 20 cases; second day, 38; third day, 65; fourth day, 60; fifth day, 63; sixth day, 45; seventh day, 52; eighth day, 57; ninth day, 38; tenth day, 50; later than tenth day, 39; not ascertained, 10 cases. The figures show that ante-partum cases are by no means unknown, since 3 per cent. of the whole number began on the day of birth. They also prove that so-called secondary infections are common, inasmuch as 281 of the total number occurred on or after the sixth day of the puerperium. This fact emphasises anew the necessity of not confining the prophylaxis to the moment of birth. A history of vaginal discharge in the mother was obtained in 213 instances, or 39·7 per cent. of the total cases. The Council endeavoured to secure accommodation for the mother and infant, so that while the baby was being treated it need not be deprived of breast milk, but we are told that two institutions only have at present adequate room for this purpose. The names of these institutions are not mentioned. During the year the services of nurses from four institutions were made use of in 27 cases.

It has been computed that about one-half of all confinements in England are attended by midwives, a question that has a direct bearing upon the prevention of ophthalmia neonatorum. But this appears to be too high an estimate, at least, for the Administrative County of London. From information received under the Notification of Births Acts, it is estimated that (excluding the cases attended by midwives in infirmaries) 25 per cent. of the total births in London are looked after by midwives.

It appears that the Council now maintains 8 blind schools (6 day and 2 residential) affording accommodation for 350 children. . It also maintains 88 children at blind schools other than those under its own immediate control. During the year, 53 new children have been certified, and of that number 14 owe their condition to ophthalmia neonatorum, 16 to congenital syphilis, 13 to congenital or lamellar cataract, and the remaining 10 to a variety of congenital defects and inflammatory conditions.

There are six myope classes working in specially arranged premises. The work of these children falls under three heads:—(1) Oral teaching in associated normal schools; (2) literary work in the special class rooms; and (3) handicraft work in the special class rooms. Full details are given of the way the work is carried out, and of the classification of myopes according to age and standard. It is pointed out that a class for myopes should not exceed twenty in number, while the best number is twelve under the control of one teacher. A list of occupations suitable for myopes when they leave school is given, and it may be noted that a preference is given to work of the outdoor type, or that enabling the worker to be out and about, [illegible] and with a minimum of close eye work, such as nursery gardening, poultry farming, hawking and street trading, canvassing and travelling for boys, and florists' work, waiting in tea shops, under nursemaids, and helpers in schools for girls. SYDNEY STEPHENSON.

The Endocrine Organs. By SIR EDWARD A. SCHAEFER, LL.D., D.Sc., M.D., F.R S. London: Longmans, Green & Co.

Professor Sir Edward Schaefer's book on the endocrine organs is a valuable contribution to medicine, and in view of the present interest that centres around auto-intoxication, using the term in its widest possible sense, an authoritative statement on the subject cannot fail to be of great value. Schaefer includes the following glands as endocrine: the thyroid, the parathyroids, the suprarenal capsules or adrenals, the pituitary body, and the pineal gland. He is disposed to omit from his list the thymus gland, the tonsils, the lymph glands and lymph-follicles, and the spleen. He defines an endocrine organ as one "which is known to form some specific chemical substance within its cells, and to pass this directly or indirectly into the blood stream." Active internal secretions may be produced by organs other than those mentioned, *ex. gr.*, by the pancreas, by the epithelium which lines the duodenum, and by that of the mucous membrane of the pyloric end of the stomach. A yet more remarkable example of the coincidence of external and internal secretory functions in the same organ is supplied by the generative glands.

The active materials of the endocrine organs are of a simpler chemical constitution than enzymes, and are not rendered inactive by boiling. Many of them act instantly, and closely resemble the active principles of vegetable drugs. Some of them stimulate or excite cell-function, while others inhibit or diminish these. The former may be called hormones, the latter chalones. Schaefer divides the endocrine glands into three groups, *viz.*, the thyroid-parathyroid, the supra-renal and the pituitary. Each group is composed of two distinct, but usually closely inter-grown parts, the functions of which are quite dissimilar. Two methods are in vogue for studying the functions of the endocrine glands, *viz.*, (1) the study of the changes which result from partial or complete surgical removal of such an organ in man and animals, and (2) the observation of the changes, which result from the administration of watery or saline extracts prepared from the organ. The extracts may be administered by the mouth, or by subcutaneous, or intramuscular, or intraserous or intravenous injection. Each is discussed in turn. A beautifully illustrated chapter is devoted to the anatomy and histology of the thyroid and parathyroid glands, another to the effects of removal of the parathyroids, another to the effects of increase of thyroid secretion, and yet another to the nature of the autacoid substances produced by the thyroid. In these, the signs and symptoms of tetany, cretinism, myxœdema, post-operative myxœdema, and of endemic and exophthalmic goitre are all dealt with at length: nor are the results of the ingestion of thyroid extract forgotten. The author considers that we are still in the dark, as to the nature of the active thyroid principle, and that it is consequently better to express our ignorance by a term which implies no theory as to the question of its identity with iodo-thyrin, or iodo-thyro-globulin; he suggests the word *thyrine* for the purpose. Similarly he would speak of *parathyrine*. Do these active principles affect the sympathetic system directly, or is their action indirect, through the mediation of other organs such as the adrenal glands? The question is a very complicated one. The wide-spread influence of the thyroid secretion on nutrition generally, and on the generative organs in particular, is discussed ; the liver and pancreas, the suprarenal capsules, the pituitary body, the thymus gland, and the nervous system are taken up in turn. If a perusal of this book does nothing else, it cannot fail to impress on the student's mind the extraordinary complexity of the functional interdependence of the various organs of the body. The thymus gland next comes under discussion, and in discussing its structure and development, allusion is made to the obscure condition known as the *status lymphaticus*. The functions of this body would appear to be very obscure. Their principal interest centres round the mutual relations between it and the male generative organs. The suprarenal capsules are taken next, and in this connection Addison's disease is discussed. The dual nature of the cortex and medulla in these glands is emphasized by the fact that in fishes the two parts are separate and distinct, whilst in all the higher vertebrates they unite into one organ. A special point is made of the extraordinarily abundant blood supply of the suprarenal organs ; it is indeed the richest in the whole body. Schaefer discusses the very fatal results of epinephrectomy, and considers that until measures can be found to induce adrenal grafts to take in man, Addison's disease will probably continue to terminate fatally. The suprarenal glands are not only important in function, but are actually essential to life, and it is probable this is due to some material yielded by the cortex. It would also seem probable that interference with the functions of the suprarenal capsules is in large measure responsible for the cardiac weakness and for the general loss of tone which are prominent symptoms in diphtheria, cholera, and certain other diseases. The physiology of adrenal secretion is elaborately considered. Next comes the turn of the pituitary body ; it is known that from one part of this gland autacoid principles can be extracted, which exert an important influence upon some of the most essential organs of the body, while from another part, it seems probable that principles, which serve as chemical regulators of nutrition and growth, are furnished to the blood. The gland is thought to be essential to life. The photographs which illustrate the anatomy of this gland are extremely beautiful, and so are the tracings exhibiting the physiological effects of adminstration of pituitary extract. Of less artistic merit, but of very great interest, are the quaint photographs illustrating the effects of hypophysectomy in dogs. The tendency to adiposity, and the deficient development of the sexual organs are both well illustrated. The phenomena of hyperpituitarism and of hypopituitarism are discussed and admirably illustrated ; the associated phenomena of gigantism and of dwarfism are discussed.

Further chapters are devoted to the pineal glands, to the internal secretions of the alimentary mucous membrane and of the pancreas, and to the internal secretions of the generative organs, both in the male and in the female.

As has been indicated, the book is profusely and beautifully illustrated. It is pleasantly written, and neither the paper nor the type show any sign of having suffered from the war. Sir Edward Schaefer is to be congratulated on once again adding to the debt which the whole medical profession owes him, not merely for the work he has done, but for the way in which he has both done it, and published it. R. H. ELLIOT.

CORRESPONDENCE.

While The Ophthalmoscope will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

DISCUSSION ON THE TREATMENT OF GLAUCOMA.

To the Editor of The Ophthalmoscope.

Sir,—In opening the discussion on the treatment of glaucoma at the meeting of the Midland Ophthalmological Society, held on April 4th, 1916, Dr. T. H. Butler says: "I believe that in Vienna 8 per cent. of sclerectomies have been lost from this cause" (personal communication from Mr. Giri), the cause referred to being late infection. I am sorry to be unable to recall having made the statement in question. However, as the object of scientific discussion among open-minded competent people is to arrive, if possible, at the truth, I am glad that what may have been on my part a mis-statement unwittingly made, or on the part of Dr. Butler a misunderstanding, has, by being given publicity to, drawn my attention to the misconception and given me the opportunity to clear it up by bringing to the notice of Dr. Butler and others interested in the matter, the actual statistics collected up to September, 1913, at Fuchs' clinic, in Vienna.

Thanking you in anticipation of kind publication of this letter and the appended statistics.

I am, yours faithfully,

Southampton.

D. V. Giri.

Statistics of scleral operations for glaucoma presented by Prof. J. Meller, Vienna, to the 85th Congress of the Society of German Naturalists and Medical Men, held in Vienna, in September, 1913.

No. of Lagrange Sclerectomies reported on 389. Percentage classification of cases:—Acute glaucoma, 12 per cent. Chronic inflammatory, 61.5 per cent. Simple glaucoma, 9 per cent. Remaining kinds of glaucoma, 17.5 per cent.

Nature of iridectomy performed:—Complete in more than half the number of cases. Peripheral in 30 per cent. No iridectomy in 4 per cent.

The period of observation extends to five years. Nature of cicatrix obtained:—Cystic œdematous bleb in more than half the number of cases (*cystischblasig-œdematös*). Ectatic in 11 per cent. Quite flat in 23 per cent.

Different forms of cicatrix in relation to different kinds of glaucoma discussed. A definite relationship between the form of cicatrix and intra-ocular tension does not exist. Nature of result obtained.—Good in 70 per cent. Decidedly bad in 10 per cent. The lens became cataractous in 4 per cent. Posterior synechiæ occurred in the great majority of cases. Severe irido-cyclitis occurred in 2.3 per cent. Cases that had to be enucleated, 3.4 per cent. Six eyes became atrophic but could not be enucleated. Cases destroyed by late infection, 1.3 per cent. Cases of loss of vitreous, 6.2 per cent. Eyes lost through expulsive hæmorrhage, 2.

Acute glaucoma was less concerned with these complications than chronic glaucoma. Simple glaucoma, with 2.8 per cent. of failures, offers the best chances.

Recrudescences occurred in 11.3 per cent. of the cases. Of these 14.3 per cent. affected simple glaucoma, as against 6 per cent. of each of acute and chronic glaucoma.

Recrudescences occurred in 7 per cent. of the cases of cystic œdematous cicatrix, 16 per cent. of the cases of flat cicatrix, 24 per cent. of the cases of ectatic cicatrix.

Here occurs the discussion of the abnormal softness of the eyes after operation and their consequences.

Automatic regulation of tension after operation.

The anatomy of the direction of incision, the development of the cicatrix, and the complications were explained by means of eleven histological preparations.

Trephining after Elliot :—Number of cases reported on, 179.

[N.B.—The summary of Professor Meller's paper contained in the transactions of the Congress which I am here citing does not give details as in the case of Lagrange's operation.]

The two operative procedures are compared with the following points in favour of the trephine operation.—Trephining is less dangerous, offers the same chances for the production of a cystic scar and leads to bad results in only 2.4 per cent. of the cases. Here it holds good even more than in Lagrange's method that the less iridectomy is performed the more the recrudescence.

In the concluding sentences Meller embodies his experiences as follows.—Elliot's method is to be preferred to Lagrange's. Iridectomy constitutes an effective factor in Elliot's operation. From the experiences so far gathered, one cannot advocate the replacing of Graefe's iridectomy by trephining. On the other hand, in difficult and dangerous cases, trephining can be employed to advantage instead of Graefe's iridectomy.

[N.B.—As I was present when Professor Meller read the paper, it would be well to make the meaning of the last sentence clear. In his opinion, the trephine hole offers a safer access to the iris where there is danger of expulsive hæmorrhage due to severe inflammation and extreme hypernormal intra-ocular tension or of injuring the lens on account of extreme shallowness of the anterior chamber, than the usual incision for iridectomy does, inasmuch as where the surgeon lacks operative skill and delicacy of handling, he is likely to plunge the knife into the lens or to use undue force in making the incision, thus bringing about a sudden and violent rather than a gentle and gradual decompression. In the case of the trephine, because of the comparatively far smaller aperture and its extreme peripheral position, these mishaps are less likely to occur. In any case iridectomy is essential. It by no means follows that the skilled surgeon can always avoid complications in the performance of Graefe's iridectomy.]

THE BRITISH JOURNAL OF OPHTHALMOLOGY.

For several months it has been more or less of an open secret that an influential committee has been at work in the patriotic endeavour to organise a representative British journal of ophthalmology. The original meeting of ophthalmic surgeons from various parts of the United Kingdom was held in

London in July last and was convened by Mr. W. H. H. Jessop, President of the Ophthalmological Society. A sub-committee was then formed, of which many meetings have been held since.

We are now in a position to announce that the new venture is *un fait accompli.* The capital of the Company is divided into 1,000 shares, each of £5. Every original shareholder in the Company must be a British born subject, and a registered member of the medical profession.

The first issue of the THE BRITISH JOURNAL OF OPHTHALMOLOGY will appear with the New Year. It amalgamates the *Royal London Ophthalmic Hospital Reports* (1857), the *Ophthalmic Review* (1881), and ourselves (1903). It will thus be without rival in the British Empire. The periodical, which will consist of at least sixty-four pages, will be published monthly, and the rate of subscription has been fixed at £1 11s. 6d. *per annum.* It will be conducted by the present Editor of THE OPHTHALMOSCOPE, Mr. Sydney Stephenson, assisted by a strong Editorial Committee. Mr. E. Erskine Henderson, of the *Ophthalmic Review*, will sub-edit the new Journal.

As regards ourselves, those whose subscriptions to THE OPHTHALMOSCOPE do not expire with the December, 1916, issue will continue to receive THE BRITISH JOURNAL for the period covered by their payments. It may be added, in conclusion, that the new journal aims at being of a more comprehensive character than any yet published in the British Empire.

NOTES AND ECHOES.

Deaths.

IT is with deep regret that we announce that Lieutenant-Colonel Arthur Nimmo Walker, the well-known eye surgeon of Liverpool, was killed at the front on September 24th. We shall publish some details of the life of this gallant officer in the next number of THE OPHTHALMOSCOPE.

The death of Professor M. Straub, of Amsterdam, has been already briefly announced in the columns of THE OPHTHALMOSCOPE.

We now publish the following appreciation from the pen of our Dutch correspondent, Dr. G. F. Rochat, of Utrecht:

At the beginning of this year it was reported that Professor Straub was seriously ill, and had to be operated upon. During the operation it became clear that there was little chance of preserving his life, and a few months later, on the 14th of April, he passed away at the age of only 57 years.

Manuel Straub completed his study of medicine in the University of Amsterdam. After having been for a few years assistant in the department of pathological anatomy, he entered the military medical service, and in this capacity was transferred to Utrecht, where he came in contact with Donders and Snellen, sen., and soon he became one of their most enthusiastic pupils. Under Donders' direction, he worked in the physiological laboratory, while as assistant to Snellen, he enjoyed ample opportunity to perfect himself in clinical ophthalmology. At the same time his original education as a pathologist led to histological work in the laboratory, to which he gave much of his time, finding ample material in the large collection of eyeballs in the eye clinic. From this resulted a series of publications on the anatomy of the cornea, on glioma, and on other subjects.

In 1895 he was called to the vacant chair of Amsterdam, which he occupied for twenty years. As a professor of ophthalmology, he brilliantly fulfilled his dual task as teacher and scientific investigator, being much appreciated by his students. Many of the eye specialists in Holland are his direct pupils. His first assistant, Dr. W. P. C. Zeeman, who worked with him for many years, was nominated his successor last month.

From Straub's many contributions to our science, apart from a great number of smaller publications on diverse subjects, must be specially mentioned his researches on the pathological changes of intraocular inflammation. Here he sharply distinguished between inflammation originating in the uvea itself, to which form he restricted the names cyclitis and choroiditis, and the inflammation of the same parts caused secondarily by infectious agents located in the vitreous, or "hyalitis," as he would have it named.

Under his direction his pupils did a great deal of statistical work on refraction. From the results of these investigations he gradually built up a theory of the causation of refractive errors in general, and of hypermetropia in particular, in which theory the function of the eye appears as the great regulator of its growth. In his opinion, the emmetropia of the normal eye is not arrived at by mere accident, but the hypermetropic eye of the newly-born becomes emmetropic under the influence of the tonic contraction of the ciliary muscle. We have to understand that the desire to get perfectly clear images on the retina, which is most vivid in normal young people, brings about the exact regulation of the ciliary tonus, and this constant action on the growth of the lens, on the one hand, and on the sclera and cornea, on the other, causes the eye to develop with exactitude emmetropic refraction. There is thus a psychical factor in the development of emmetropia. If in our youth we do not pay sufficient attention to things around us, our ciliary muscle is not stimulated to sufficient exertion, and our eyes do not become emmetropic.

Straub's publications all show original thought and literary taste. He was generally praised as an eloquent speaker and successful debater. To many, however, his theories, however brilliant of conception and skilfully expressed, seemed built on a not very solid basis, and his facility of speech occasionally led him to the emission of views that, on second thoughts, left his hearers less satisfied than they were at first. Although his communications did not always meet general approval, then, they nevertheless never failed to arouse animated discussion, and to many of his opponents he gave the stimulus to new researches, by opening new vistas.

At the beginning of his professoriate the Amsterdam eye clinic was part of a general hospital, and in all respects left much to be desired. Thanks to his never-failing energy, the University of Amsterdam now possesses a very good eye clinic, equally well-equipped for scientific research as for the teaching of students and the cure of eye diseases. It will be remembered that Straub took an active part in the war against trachoma in Amsterdam, the only place in Holland where it is still endemic. G. F. ROCHAT.

An American ophthalmic surgeon with many friends in this country, Wilbur B. Marple, of New York City, died suddenly on August 30th. He appeared to be in the best of health, and was on the golf links when stricken. We offer our deep condolences to his widow.

We regret to announce the death of Pedro Lagleyze, of Buenos Ayres, which occurred upon August 14th. He was professor of clinical ophthalmology in the Faculty of Medicine of Buenos Ayres, and President of the Academy of Medicine. His scientific writings are well known and widely appreciated not only in South America, but in Europe as well.

We regret to learn of the death at Valladolid of Emilio Alvarado, the distinguished Spanish correspondent of THE OPHTHALMOSCOPE. Born at Burgos in 1853, he pursued his studies at Valladolid, where his father was in practice. He enlisted in the French Army in 1870, and was taken prisoner at the battle of Orleans. After completing his medical studies, he started practice at Burgos, but on the death of his father, he settled permanently at Valladolid. In 1880 he spent some time in Paris with de Wecker and Galezowski, and since then has made his name famous by his contributions to many ophthalmological journals. He was particularly active in combating ophthalmia neonatorum, and spent large sums of money in disseminating knowledge on the value of prevention. In May, 1915, he was publicly honoured by the city of Valladolid.

Neisser, the discoverer of the gonococcus, died recently at the age of 61 years. His great discovery was made when he was only twenty-four years of age.

* * * *

Appointments. E. C. TEMPLE-SMITH, D.O. (Oxon.), has been appointed honorary ophthalmic surgeon to St. Vincent's Hospital, Sydney, N.S.W.

J. Hilliard, of Blackpool, has been appointed eye specialist at Amara, a port on the Persian Gulf.

* * * *

An Interesting Letter. WE have seldom seen a more *naïve* letter than the one quoted below from our respected colleague, Dr. J. Santos Fernandez, of Cuba, to the Editor of the *Medical Review of Reviews* (September, 1916):

> *To the Editor*:
>
> In the evening of my life, if I were asked what quality is most essential for success, I would unhesitatingly answer: persistency. To reach the goal of aspiration, perseverance is more important than cleverness.
>
> At school I was not bright, and several of my comrades who passed me must wonder how I became President of the Havana Academy of Sciences. It was my doggedness that did it. When they stopped, I continued plugging.
>
> Forty-three years ago I tried to write my first paper on ophthalmology. I then lived in Paris, opposite the great Ricord—but even that didn't help me. I fortified myself with strong coffee, but my paper remained blank. But I kept on, and after some years I became so prolific that I had to employ three stenographers. If you will consult the *History of Ophthalmology in Cuba*, you will find that I am there described as the most fecund medical literary man of Cuba!
>
> Many years ago I had the honour of meeting the renowned Professor Ramon y Cajal in his laboratory of Barcelona. In the course of our conversation, Cajal said that even genius will fail if not accompanied by constancy, and Cajal ought to know—because he himself was a genius.
>
> JUAN SANTOS FERNANDEZ.
>
> Prado 105, Habana.

* * * *

The American Examination in Ophthalmology. SERIOUS attention has been paid during the last few years in America to the question of a special examination for those who purpose to devote themselves chiefly or exclusively to ophthalmology. The details of a coherent national scheme are now published.—The American Board for Examinations in Ophthalmology has been formed from among the members of the American Ophthalmological Society, the American Academy of Ophthalmology and Oto-Laryngology, and the Section on Ophthalmology of the American Medical Association. It will issue certificates after examination. The fees payable amount to twenty-five dollars. Those eligible for the examination include reputable graduates of at least two years' standing, who can present evidence of the study of ophthalmology adequate to give them a working knowledge of that subject. Special regulations apply to those who actually practise ophthalmology, according to the length of time they have worked at that specialty. Candidates for examination must submit reports of five eye cases, and these may be used as a basis for the oral part of the examination. The last-named will be clinical, *viva voce*, written, and laboratory. It need only be noted, in conclusion, that after 1920, the Board's certificate will be required of all applicants for membership of the American Ophthalmological Society and the American Academy of Ophthalmology and Oto-Laryngology.

Dr. E. C. Todd, of Minneapolis, Minn., is the Secretary of the Board.

* * * *

The American Ophthalmological Society.

THE following officers have been elected for the ensuing year:—President: Dr. Peter A. Callan, New York. Vice-President: Dr. W. H. Wilder, Chicago. Secretary-Treasurer: Dr. W. M. Sweet, Philadelphia.

THE OPHTHALMOSCOPE DIARY.

	1916.	
Section of Ophthalmology, Royal Society of Medicine.	November 1st.	1, Wimpole Street, London, W
Midland Ophthalmological Society	December 5th.	Leicester.
American Academy of Ophthalmology and Oto-Laryngology.	Dec. 11th, 12th. and 13th, 1916	Memphis, Tenn.
	1917.	
Midland Ophthalmological Society	February 6th.	Birmingham.
Section of Ophthalmology, Royal Society of Medicine.	February 7th.	1, Wimpole Street, London, W.
Midland Ophthalmological Society	April 3rd.	Birmingham.
Ophthalmological Society U.K.	May 3rd, 4th, and 5th.	London.
Midland Ophthalmological Society	June 5th.	Oxford.
Section of Ophthalmology, Royal Society of Medicine.	June 13th	1, Wimpole Street, London, W.

THE

OPHTHALMOSCOPE

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. XIV.—No. 12. *DECEMBER 1, 1916.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

THE DIAGNOSTIC VALUE OF TUBERCLE OF THE CHOROID.*

BY
SYDNEY STEPHENSON,
LONDON, ENGLAND.

Introductory.

IT appears to me that in modern times there is some little tendency to overlook the general diagnostic value of tubercle of the choroid. As regards affections of the meninges, the importance now attached to a naked-eye, chemical, microscopic, and bacteriological examination of the cerebro-spinal fluid is doubtless partly responsible for this neglect. How simple is the diagnosis, say, of a tuberculous meningitis rendered when, in association with meningeal symptoms, the cerebro-spinal fluid is found to have lost its normal limpidity, to contain lymphocytes, and to include tubercle bacilli. At the same time it is well to remember that the discovery of tubercle of the choroid may enable us to diagnose, not only diseases of the central nervous system, but the tuberculous nature of lesions of other parts of the body. In one condition, indeed, acute tuberculosis, it is the sole pathognomonic sign.

The three following cases fell under my notice, within a few short months, in the Queen's Hospital for Children, London. I present them merely in abstract.

Cases.

CASE NO. 1.—*Case admitted as one of apical pneumonia, but recognised as general miliary tuberculosis by the finding of tubercles in the choroid. Autopsy. Tuberculous nature of the choroidal lesion confirmed microscopically.*

Henry M——, aged seven months, admitted November 13th, 1912, and died November 15th, 1912.

There had been a slight cough for two weeks. Child had been ill for four days. This illness began with vomiting immediately after food.

No previous illness. Baby bottle-fed from birth. Parents healthy. No other children.

On admission.—A well-nourished infant. T. 100°F.; P. 120; R. 36. Looks "meningeal." Head slightly retracted, and limbs rather rigid. Respiration rapid. The percussion note is impaired over the apex of the left lung, although the impairment does not amount to actual dulness. The affected area shows broncho-vesicular breathing, together with fine and medium crepitations. A diagnosis of apical pneumonia made.

Course and progress.—On the following day (November 14th) there was conjugate deviation of the eyes to the left. The left fundus oculi showed large circular tubercles of the choroid in the central region.

Death occurred at 9 a.m. on November 15th, being preceded by a temperature of 104°F.

The general *post-mortem* examination showed large caseous areas in the left upper lobe of the lung, the remainder of which was in an acute pneumonic condition. The other lung, the spleen, the peritoneum, and the meninges were studded with miliary tubercles.

The choroidal lesions showed the ordinary structure of choroidal tubercle,

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[illegible]

namely, lymphoid cells, endothelioid cells, and giant cells. Tubercle bacilli were also present. Areas of caseation were not uncommon.

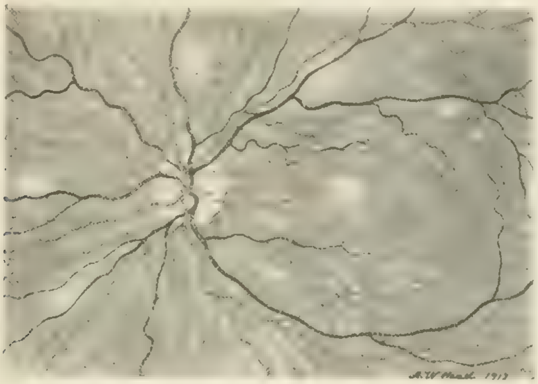


FIG. 1,

CASE NO. 2.—*Child, aged 6 years, admitted for (?) appendicitis. Exploratory abdominal incision revealed tuberculous peritonitis. Finding of tubercle of choroid led to diagnosis of acute tuberculosis. Death.*

Gladys H., aged 6 years, admitted October 30th, 1912.—The child had been ailing on and off for several months. The bowels had been costive, and there had been pain in the abdomen. For the last two days the pain had been worse, and there had been retching and sickness.

Family History.—One other child alive and well. One died at four months from "wasting." One died, premature birth. Father suffers from diseased leg, present since he was three years of age. Mother has not been well since marriage. Mother's brother died from consumption, and a sister is now very ill with the same disease. Paternal grandfather died from phthisis pulmonalis.

On admission.—T. 102°, P. 156, R. 36. Pain in abdomen, aggravated by deep palpation. Abdomen, which moves well with respiration, is slightly distended. No rigidity. Doughy feeling. Some dulness at base of right lung and in a 3 inch patch at angle of right scapula, over which fine crepitations and moist râles may be heard.

Two hours after admission, under the impression that the case might be one of pneumococcal peritonitis, the abdomen was opened by a small incision over the margin of the rectus muscle. The peritoneum was found to be studded with small miliary tubercles. The wound was closed in three layers (peritoneal, fascial, and cutaneous).

Course and progress.—November 3rd, 1912. Tubercles found in both choroids. On same date T. bacilli found in urine.

November 5th, 1912. Sketch made of left fundus, which shows no fewer than eight tubercles, all situated in the central region of the fundus, and varying in size from 1/10 to 1/4 the diameter of the optic disc (Figure 1).

November 7th, 1912. Multiple tubercle of both choroids.

November 12th, 1912. Slight optic neuritis. Retinal veins full. Tubercle in all stages in the fundi.

December 6th, 1912. Child getting thinner. Slight but numerous physical signs in the lungs. Spleen palpable. Abdomen soft. Examination with X-rays showed poor movements of the diaphragm, especially in the right side. Both lungs "fuzzy," due to miliary tubercle.

The child died at 5.25 a.m. on December 20th, 1912.

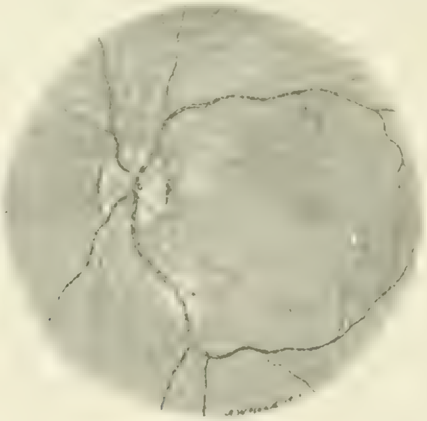
CASE NO. 3.—*Child, aged 3 years; admitted as a case of lobar pneumonia. Diagnosis of typhoid fever thought more likely in Hospital. The discovery of tubercle of the choroid, however, led eventually to the diagnosis of acute tuberculosis, from which the patient succumbed. Autopsy. Examination of the choroidal tubercles.*

Caroline U——, aged three years, admitted October 24th, 1912, as a case of lobar pneumonia. Ill two weeks. Onset gradual. Began with headache and diarrhœa. Anorexia. Bowels open two or three times daily. Irregular now. Occasionally wanders at night. No history of epistaxis. No previous illness. Family history good.

On admission.—Face pale. Child restless. Respiration very hurried. No cyanosis. Pulse 160. T. 103·6°F. Heart sounds normal. As regards the lungs, there seems to be impairment at left apex anteriorly and at right base anteriorly. Breath sounds weak. Rhonchi everywhere present.

Progress and course.—October 27th, 1912.—Aspect typically pneumonic. Respirations 56-66 per minute. No cyanosis. Breath sounds weak. Rhonchi everywhere. Skin hot and dry. T. 101.2°—103.8° F.

October 29th, 1912.—Child looks ill and is rather grey. Eyes sunken. Delirious last night. Signs of bronchitis still present. No vomiting. But child has passed several stools, which are very loose, of a light yellow colour, and very suggestive of typhoid stools. Patient complains of abdominal pain, but the abdomen is not distended, and there are no spots. The spleen, of rather soft consistency, is palpable one inch below the costal margin. Grünbaum-Widal reaction is negative. R. 48—60. P. 132—168. T. 101°F.—[illegible]



[illegible]

November 5th, 1912.—Spleen still palpable. No spots, and stools still loose, of a light-yellow colour and containing digested food. White blood count 10,500 per cubic centimetre. T. 101°F.—104°F.

November 8th, 1912.—Two choroidal tubercles discovered in the left fundus oculi on outer side of the optic disc (Figure 2). None visible in the right.

November 11th, 1912.—X-ray report.—The diaphragm moves poorly on both sides. The tissue of the left lung is much less translucent than normal, especially about its middle part, where it is mottled. Enlarged bronchial glands are seen on the right side, where shadows radiate into the lung, and there is also some mottling into this lung.

November 18th, 1912.—Child is growing weaker and the pulmonary signs [illegible] T. [illegible] F.—[illegible] F. R. [illegible] P. [illegible]

November 23rd, 1912.—The child died suddenly, death being preceded by a rise in temperature to 101°F.

Post-mortem examination.—Miliary tuberculosis of lungs, liver, spleen, and kidneys. No naked-eye evidence of tuberculosis of the brain or meninges.

The eyes, examined after hardening in formol-saline, presented the usual histological structure of miliary tubercle of the choroid. Tubercle bacilli were unusually numerous in some of "giant-celled systems."

Remarks.

Each of the foregoing cases, then, was an instance of acute tuberculosis, diagnosed as such by the discovery of tubercle of the choroid. In one, the diagnosis was made from an apical pneumonia; in a second, from pneumococcal peritonitis; and in a third, from typhoid fever. The diagnosis in the last case was particularly difficult. The physical signs were not at all well marked, and at first pointed in the direction of pneumonia. There was no constipation, as usual in case of acute tuberculosis. The stools averaged 2·22 *per diem.* The respirations ranged from a minimum of 36 to a maximum of 84 per minute and averaged 52·18 *per diem.* But there was no cyanosis. The chief characteristic of the temperature was its irregularity. On three occasions, October 26th, November 9th, and 10th, it fell almost to normal. At night it usually rose to 103·2° Fahrenheit to 105° Fahrenheit, and the morning remission amounted to 1°-3° Fahrenheit. The case looked much like one of typhoid fever until tubercles were discovered in the choroid and the Grünbaum-Widal reaction was discovered to be negative. The diagnosis then, and then only, appeared to be plain. I could multiply such cases almost indefinitely.

The cases described in this communication were met within the course of a couple of months. This lends point to the truth of what I have always maintained, namely, that acute tubercle of the choroid is by no means an uncommon manifestation, if looked for in the right places and in the right way. It is scarcely likely to be met with in the ophthalmic out-patient department. Under ordinary circumstances, when an ophthalmic surgeon visits a children's hospital once or twice a week, it is not probable that tubercle of the choroid will often fall under his notice. But when an enthusiastic house physician systematically looks over his in-patients with an ophthalmoscope, then tubercle, in my experience, is not uncommonly found. The use of euphthalmin, and, in particular, the employment of an electric ophthalmoscope, are great aids. Nobody has emphasized these points more than the late Dr. Wilbur B. Marple, of New York (THE OPHTHALMOSCOPE, 1912, p. 559), who in examining the eyes of thirteen babies affected with tuberculous meningitis, found tubercle of the choroid in every one. Another point rightly insisted upon by Marple is the frequency of the examination.

It is sometimes forgotten that, next to the stethoscope, the ophthalmoscope is the greatest weapon of precision possessed by the medical practitioner. There is no greater excuse for neglecting the one than the other. When the technical difficulties of the ophthalmoscopic examination are great (and that is admittedly often the case), I personally never hesitate to have a little chloroform given, in order to facilitate the process. In that event the speculum and the fixation forceps may have to be used.

The diagnostic value of chronic tubercle of the choroid is also great, although I shall not touch on that matter in the present communication.

THE COSMETIC RESULTS OF OPERATIONS FOR CONVERGENT SQUINT.*

BY

T. HARRISON BUTLER, M.D., Oxon.

LEAMINGTON SPA, ENGLAND.

THE public judge an operation for squint by its cosmetic results. If an eye be placed by operation within five degrees of parallelism, the parents of a child will be quite satisfied, and do not trouble about questions of binocular vision and fusion.

I cannot help thinking that much is written about fusion training, but that comparatively little actual work is done in this direction. We have not time to carry out a course of orthoptic exercises upon hospital patients, and few of our private patients are willing to pay for the prolonged treatment required, especially when we can hold out little hope of a successful issue. Again, in my experience, children who squint are uncommon visitors to our private consulting rooms. It would almost seem that squint is essentially a disease of hospital patients.

Probably comparatively few squinting children ever gain true binocular vision, nor do the few who attain it always retain the function.

Most of us will, I think, agree, that from a practical point of view, we should, in treating a case of strabismus, keep three objects in view: the prevention of amblyopia; the careful correction of errors of refraction; and the cure of the deformity.

We strive to prevent amblyopia in young children, by occluding the fixing eye until a tendency to alternation develops and by correcting the errors of refraction at the earliest age possible.

These measures will cause most convergent squints of low and moderate degree to disappear, or to become so slight that the deviation ceases to be a deformity. A slight convergence may even be held to be attractive; and is frequently to be seen in portraits by the Old Masters.

We seek to aid our efforts in the case of older children by "bar reading," by the use of Kroll's pictures in the stereoscope, and by the amblyoscope, or some similar instrument.

I am bound to confess that, in my hands, fusion training has, on the whole, been a comparative failure, but I do not wish to decry such efforts because I have had little success with them.

Many anomalies are met with. I have seen a child with a well-marked squint do bar reading easily and fluently, and also apparently fuse Kroll's pictures in the stereoscope. I make no attempt to explain these unusual cases, but they certainly make me wonder whether all our theories of binocular vision are correct. In this connection the views upon the subject recently put forward by F. W. Edridge-Green seem worthy of attention. In fact, he tells me that his theory accounts for such anomalies, and that he would expect them.

In spite of careful and long-continued employment of these methods of treatment, a certain number of children will continue to squint. In such cases my present practice is to wait until they are old enough to be docile subjects for an operation under local anæsthesia. The best average age seems to be seven or eight, but much depends upon the child's temperament and home training.

I have for the purposes of this paper collected the records of 76 operations for convergent strabismus performed during the past eight years at the Coventry and Warwickshire Hospital and the Warneford and Leamington Hospital. The following table gives an analysis of the final results obtained :—

Statistics of Seventy-six Operations for Convergent Strabismus.

Average deviation	34°	Greatest 45°	Least 10°
Average age	12	Oldest 30	Youngest 3

Average effect of the operations :

Complete success	39 cases	=	50 per cent.
Partial success	28 ,,	=	37 ,,
Failure	9 ,,	=	12 ,,

Successful Cases—39.

Average deviation	35°
Average age	11·3

All hypermetropes.
No amblyopic eyes.

Partial Successes—28.

Average deviation	33°
Average age	11·3

Deviation left :—

5°	16 cases	=	57 per cent.
7°	2 cases	=	8 ,,
10°	7 cases	=	25 ,,
15°	3 cases	=	10 ,,

Convergence left in 27 cases — Average angle 7°
Divergence ,, 1 case — ,, ,, 5°

Failures—9.

Average deviation	38°
Average age	13·5
Bad divergence left	4 cases
Bad convergence left	5 cases

Three of these patients were operated upon a second time with satisfactory results.

I have no idea how these figures compare with the work of others, whether they are good or bad, but I imagine that they represent a fair average.

The original deviations are the maxima noted without glasses ; the final effect has been observed with the patient wearing a full correction of any error of refraction.

Practically all the patients had worn spectacles for at least a year, and many for a much longer period, before any operation was performed.

I have in most cases judged the angle of squint by inspection, but in some instances the angle has been measured upon the perimeter. I find that when an instrument is used, such as the perimeter or the Priestley Smith tape, the deviation increases, and, upon the whole, I think that inspection is sufficiently accurate for clinical use.

It will be noted that the average deviation was 34 degrees, and the average age twelve. I was surprised to find the age so high, but a few adults raised the average to the figure stated.

I have operated upon few squints with a deviation under 20 degrees, for most of these can be treated without operation.

I find that 38 per cent. had a deviation of 40 degrees or more, and that the average angular effect of all operations works out at 27 degrees.

In all but one of the cases included in the table the operation chosen has been tenotomy of the central tendon of the median rectus, combined with Worth's advancement of the lateral rectus. My later operations have been reinforced by an "anchor suture" which I shall shortly describe.

I have performed no simple tenotomies, and have had little success with simple advancement without tenotomy of the antagonist. I have found that the constant pull of the internal rectus has caused the sutures to tear out of the sclero-corneal tissue on about the third day, so that the final position of the eye has often been worse than it was before operation. I am aware that Mr. C. Worth and others obtain good results with advancement alone, and therefore I can only conclude that my *technique* has been at fault.

I now perform the operation as follows:

Cocaine in a 4 per cent. solution is instilled into the eye three times at intervals of five minutes, and just before the operation commences, a few drops of codrenine are injected under the conjunctiva over the insertions of the two recti muscles. These measures insure an absolutely painless operation.

The lashes are now cut short. This is important, because if they be left long, they become matted together by the secretion which is provoked by the irritation of the sutures.

If the scissors be dipped into sterilized paroline, the lashes adhere to them and do not fall into the conjunctival sac, whence they may obtain entrance to the wound and lead to the formation of cysts.

I scrub the lid margins with tincture of iodine, and place a piece of butter muslin over the face to protect the sutures from infection.

Worth's operation is now performed with the addition of the "anchor suture." This is passed as follows:—

A piece of fine catgut is inserted close to the external canthus through the conjunctiva, Tenon's capsule, and rectus muscle. It is now threaded through the tag of the tendon which has been left attached to the insertion for this purpose. It is returned back through the tag, the belly of the muscle, Tenon's capsule, and conjunctiva. Catgut is used because this suture is rather difficult to remove.

The procedure is sufficiently explained by the diagram (see next page).

The tenotomy can generally be performed by seizing the muscle through the conjunctiva and Tenon's capsule with fixation forceps, and cutting the whole mass of tissue grasped in the forceps with scissors. The injection of codrenine makes this method of performing tenotomy a little uncertain, and it may be necessary to use a hook. I always employ a very small one for the purpose. The ordinary tenotomy hook is quite needlessly long, and disturbs the surrounding tissues.

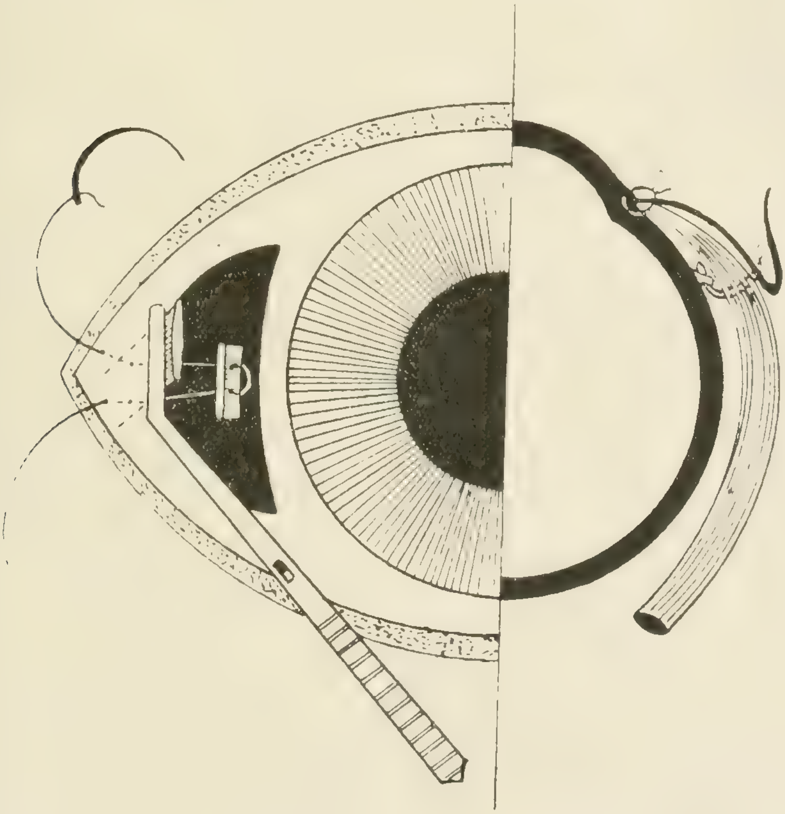
Unless the deviation be great, I try to include the tendon in the suture which closes the conjunctival wound. My object is not to set-back the muscle, but only to paralyse its action for a day or two.

When the tenotomy is complete, I tie the advancement sutures. In the case of a small deviation, I tie them in bows, so that if the effect prove too great, I can loosen them.

I bandage both eyes for ten days, and keep the patient in bed. On the tenth day, the sutures are removed.

The result may be disappointing at first, but it is apt to improve in a few weeks, as the wounds cicatrise. I have had cases in which upon the tenth day, the eye was in its original faulty position, but at the end of a month, the eyes were parallel and remained so.

This fact shows how futile it is to imagine that the operation can be "dosed" to a few degrees. I have seen descriptions of instruments graduated in millimetres to measure the exact amount by which the muscle is to be shortened or advanced, each millimetre having a fixed relation to the angular effect produced. I find that the final effect may vary by at least ten degrees from the first result obtained from the operation. The eye may be left in the correct position, but may ultimately converge or diverge. On the other hand, the reverse is equally common. A converging eye may become parallel with its fellow. I have, however, never seen a divergent eye return to the correct position. The common cause of failure is due to the fact that the sutures have cut out of the limbal tissue on the third day, and the eye has converged.



I have occasionally operated upon both eyes, and have even then failed to remedy a moderate convergence.

In my series, which was compiled by taking all the cases from the operation books without any selection, only nine operations were complete failures. Four of these converged more than 15 degrees and four of them diverged more than 15 degrees.

None of the completely successful cases possessed an amblyopic eye, but there were several among the partial successes.

I think we may say that no operation can be guaranteed to place the squinting eye within five degrees of parallelism. But if the vision be good in both eyes, and if a full correction be worn, we can trust Nature to do the rest.

A certain number of these patients obtain some degree of fusion; others good alternate vision.

I would ask: "Is binocular vision so very necessary?" I never remember any patient complaining that he had not binocular vision, unless he had diplopia.

None of my patients who have experienced squint operations for convergent strabismus have noticed more than transient diplopia, but I have been careful to avoid any intervention upon cases of slight squint and heterophorias.

Finally, I suggest that *the chief object of an operation for squint is to obtain a good cosmetic result.* If fusion develop, so much the better, but if it does not, the patient will be equally pleased.

Discussion.

Mr. Wood White, of Birmingham, described a method he had recently adopted to secure a better hold upon the sclera. With a Graefe knife he turned back a small flap through which he passed his sutures. He found that this greatly facilitated the operation, and he thought that the stitches passed in this manner were less likely to cut out prematurely.

Mr. M. S. Mayou, of London, said that he adopted a method of tenectomy which gave very reliable results.

Mr. J. Jameson Evans, of Birmingham, said that the operation described by Mr. Mayou was identical with that performed and published by Mr. Priestley Smith. He himself performed it in preference to advancement.

DIAGNOSIS IN UVEITIS.*

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(Concluded from p. 5[illegible].)

I. Spirochæta Pallida.

The material employed in the following experiments was kindly procured for me by Dr. Meldon. He selected known syphilitic cases with vulvar condylomata and scanty discharge. By swabbing a condyloma with absolute alcohol, he killed surface organisms, and in most instances obtained a watery exudate. This, pipetted into warm saline, was ready for injection. Evidence of the presence of the spirochæta pallida in the exudate was not visually confirmed in any of the experiments.

The Experiments.

14.10.15.—O. D. rabbit No. 7, injected syph. exudate.
16.10.15.—O. D. iritis.

* Mary Louisa Prentice Montgomery Lecture, delivered in the School of Physic in Ireland, on [illegible]

29.10.15.—Aq. h. O. D. examined with syph. and tubercular antigens.

	sy. a.	tb. a.
Result :—Aq. h. O. D. undil.	$+^2$	$+^1$
„ control $+^1$		

8th Experiment.

27.1.16.—O. D. rabbit No. 10, injected syph. exudate.

9.2.16.—O. D. mild iritis.
Aq. h. O. D. examined with syph. and tb. antigens.
Result :—Negative.

1.3.16.—O. D. quiet—post. synechiæ.
Aq. h. O. D. and blood examined with syph. and staphylococcai antigens.

	sy. a.	staph. a.
Result :—Aq. h. O. D.	—	—
Bl. 1 in 100 (not tested beyond)...	$+^3$	—

19.4.16.—Aq. h. O. D. and blood examined with syph. and diphtheritic antigens.

	sy. a.	diph. a.
Result :—Aq. h. O. D.		-
Bl. 1 in 5	+	+
1 in 10	$+^1$	$+^3$
1 in 100	—	—

In this experiment the blood was examined on two different occasions with syph. antigen, before the intra-ocular injection, and found negative. This is a necessary preliminary, as normal rabbit blood in low dilutions frequently inhibits complements in the presence of syph. antigen.

9th Experiment.

8.3.16.—O. S. rabbit No. 15, injected syph. exudate.

12.3.16.—O. S. acute iritis.

22.3.16.—Aq. h. O. S. and blood examined with syph. and tb. antigens.

	sy. a.	tb. a.
Result :—Aq. h. O. S. dil. 1 in 4	$+^1$	$+^1$
Bl. btw. 1 in 20 and 1 in 160 ...	—	—

Further examination unsuccessful owing to clotting in tubes of aq. h. after addition of complement.

10th Experiment.

26.5 16.—O. S. rabbit No. 16, injected syph. exudate.

29.5.16.—O. S.—panophthalmitis rendered withdrawal of aq. h. impossible.

5. TUBERCLE BACILLUS.

11th Experiment.

27.10.15.—O. D. rabbit No. 8, injected bovine tb., heated $\frac{1}{4}$ hour at 51° C.

1.11.15.—O. D. mild iritis. Second similar injection.

4.11.15.—O. D. acute iritis.

25.11.15.—Aq. h. O. D. examined with tb. and syph. antigens.

	tb. a.	sy. a.
Result :—Aq. h. O. D undil.	$+^3$	$+^2$

13.12.15.—O. D. seclusio pupillæ—deep ant. chamber - no external congestion
Aq. h. O. D. examined with tb. and staph. antigens.

		tb. a.	st. a.
Result :—Aq. h. O. D., 1 in 5	... ...	$+^2$	$+^1$
,, ,, 1 in 10	... ...	$+^1$	—
Aq. h. O. S. undil.	... ...	$+^1$	not tested

6.1.16.—Aq. h. O. D. examined with tb. and syph. antigens.

		tb. a.	syph. a.
Result :—Aq. h. O. D. undil.	. ...	$+^3$	—

15.3.16.—Aq. h. O. D. and blood examined with tb. and diphtheritic antigens.

			tb. a.	diph. a.
Result :—Aq. h. O. D. dil.,	1 in 5	...	$+^3$	$+^3$
,, ,,	1 in 20	...	—	—
Blood dil.	1 in 10	. .	$+^3$	$+^3$
,, ,,	1 in 50	...	—	—

Further examinations of aqueous humour and blood showed no specific fixation of complement in presence of tubercular antigen.

12th Experiment.

19.11.15.—O.D. rabbit No. 9, injected human tubercle bacilli.
22.11.15.—O. D. acute iritis.
1.12.15.—Aq. h. O. D. examined with tb. and syphilitic antigens.

		tb. a	sy. a.
Result :—Aq. h. O. D. undil.	... ...	$+^3$	$+^1$

13.12.15.—O. D. acute secondary glaucoma.
Aq. h. O. D. examined with tb. and staphylococcal antigens.

		tb. a.	staph. a.
Result :—Aq. h. O. D. undil.	... ...	$+$	—
,, ,, 1 in 10	.. ...	$+$	—
Aq. h. O. S. undil.	... ...	—	not tested.

Passing to the second series of experiments, it is obvious that the detection of amboceptor in higher dilutions of aq.-h. than of blood serum would demonstrate its local production, or local concentration. None of my previous experiments, in which both blood and aqueous were examined, giving examples of this, I determined to make the following tests. Causing a general immunity in a rabbit with organism A., and an intra-ocular immunity with organism B., I examined blood and aqueous for amboceptor A. and B. If amboceptor B. appeared in a higher aq. h. dilution proportionately to the blood serum than amboceptor A., it would be suggestive of a local production of B., or its greater power of penetration through a ciliary filter inflamed by its own antigen : in either case an aid to local diagnosis. In most of the cases the aqueous humour of the sound eye was also examined, it being quite conceivable that a local uveal production of amboceptor B. might take place in both eyes.

13th Experiment.

12.1.16—7.2.16.—Rabbit No. 11 received five intravenous injections of staph. aureus—lowest dose 50 m. bact., highest dose 1,500 millions.
14.2.16.—Symptoms of general septicæmia.
17.2.16.—O.D. injected 3 m. diphtheroid bacilli, heated half an hour at 50° C.
18.2.16.—O. D. iritis.

21.2.16.—Aq. h. O. D. and blood examined with staph. and diph. antigens.

Results :—Aq. h. O. D. undil.—unsatisfactory controls.

			staph. a.	diph. a.
,,	,,	1 in 5 to 1 in 100	—	—
,,	O. S.	undil	$+^{1}$	$+^{1}$
,,	,,	1 in 2	—	—
Blood		1 in 50	$+^{3}$	$+^{3}$
,,		1 in 100	$+^{3}$	—
,,		1 in 300	—	—

*9.3.16.—Same fluids re-inactivated and examined.

			staph. a	diph. a.
Result :—Aq. h. O. D.		1 in 5	—	$+^{3}$
,,	,,	1 in 10	—	—
Blood		1 in 100	$+^{3}$	$+^{3}$
,,		1 in 200	$+^{3}$	—
,,		1 in 400	$+^{3}$	—
,,		1 in 800	—	—

14*th Experiment.*

21.1.16—21.2.16.—Rabbit No. 12 received 5 intravenous injections of diph. bac.—lowest dose, ·1 of 5 ccs. emulsion over-night serum slope; highest dose, 1 cc. of same.

17.2.16.—O. D. injected 10 m. staph. aur., heated half an hour at 50° C.

23.2.16.—Condition of O. D.—very acute iritis.

Aq. h. O. D. and blood examined with staph. and diph. antigen. Aq. h. examination of no value owing to an admixture of blood on withdrawal.

15*th Experiment*

28.2.16—27.3.16.—Rabbit No. 13 received five intravenous injections of diph. bac.—lowest dose, .2 of 5 ccs. emulsion over-night serum slope, heated 65° C., ¼ hour; highest dose, .5 cc. ditto, unheated.

27.3.16.—O. D. injected .1 of 10 ccs. emulsion staph. aur. over-night agar slope, heated 65° C. half an hour.

5.4.16.—O.D. well developed iritis.

5.4.16.—Aq. h. O. D. and blood examined with staph. and diph. antigens.

		staph. a.	diph. a.
Result : Aq. h. O. D.	1 in 5	—	$+^{1}$
,,	1 in 10	—	—
Blood	1 in 10	—	$+^{3}$
,,	1 in 100	—	$+^{1}$

(Not tested beyond).

10.4.16.—O.D. injected: .1 staph. emulsion (see above), heated 60° C. half-an-hour.

Aq. h. O. D. and blood examined with staph. and diph. antigens.

			staph. a.	diph. a.
Result :—Aq. h. O. D.		undil.	—	$+^{3}$
,,		1 in 10	—	—
,,	O. S.	undil.	—	$+^{3}$

(not tested beyond).

		staph. a.	diph. a.
Blood	1 in 5	$+^{1}$	$+^{3}$
,,	1 in 10	—	$+^{3}$
,,	1 in 100	—	$+^{3}$

(not tested beyond).

---

*Proportion of diph. amboceptor in aq. h. and blood lies between 1 in 11 and 1 in 39.

*19.4.16.—Aq. h. O. D. and blood examined. Examination of aq.h.O.D. useless owing to admixture of blood.

		staph. a.	diph. a.
Result :—Aq. h. O. S. undil.	... ...	+¹	+
,,	1 in 5	—	—
Blood	1 in 10	+¹	+
,,	1 in 50	—	+
,,	1 in 100	-	+¹

(not tested beyond).

16th Experiment.

9.3.16—27.3.16.—Rabbit No. 14 received four intravenous injections of staph aur.—lowest dose, .1 of 10 ccs. emulsion over-night agar slope, heated 68° C three quarters of an hour; highest dose, ditto, heated 62° C. half an hour.

27.3.16.—O. D. injected .1 of 5 ccs. emulsion over-night serum slope diph. bac., heated 65° C. quarter of an hour.

5.4.16.—Condition of O.D. acute iritis.
Aq. h. O. D. and blood examined.

		staph. a.	diph. a.
Result : Aq. h.	1 in 5	+¹	+¹
,,	1 in 10	+	—
	(not tested beyond).		
Blood	1 in 10	+	—
,,	1 in 100	+¹	—

(not tested beyond).

10.4.16.—Aq. h. O. D. and blood examined.
Result :—*Aq. h. O. S. in this and subsequent examinations negative with both antigens.

		staph. a	diph a.
Aq. h. O. D.	1 in 20	[illegible]	[illegible]
	(not tested beyond).		
Blood	1 in 10	+	+
,,	1 in 50	+	—
,,	1 in 100	—	—

†19.4.16.—Aq. h. and blood examined.

		staph. a.	diph. a.
Result :—Aq. h. O. D.	1 in 10		+
,,	1 in 2	—	+
,,	1 in 50		—
Blood	1 in 10	+	+
,,	1 in 50	+	—
,,	1 in 100	+	—

(not tested beyond).

11.5.16.—Aq. h. and blood examined.

		staph. a.	diph. a.
Result :—Aq. h. O. D.	1 in 10	[illegible]	[illegible]
.	1 in 50 ...	—	—
Blood	1 in 40 ...	[illegible]	[illegible]
.	1 in 1[illegible] . ..	—	—

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* Proportion of diph. amboceptor in uninfected aq. h. and blood between 1 in 25 to 1 in 100 or less (compare experiment 13), of staph. ambo. 1 in 3 to 1 in 49.

† Proportion of staph. antigen in aq. h. and blood between 1 in 4 to 1 in 5 (probably lower), proportion of diph. a. in aq. h. and blood between 1 in 2 and 1 in 3 or higher (compare experiment 15).

17th Experiment.

12.5.16.—O. D. rabbit No. 17, injected .2 of 10 ccs. emulsion 24 hour agar slope staph. aur., heated 63° C. half an hour. Intravenous injection .01 of 10 ccs. ditto B. coli, heated as above.

13.5.16.—O. D. mild iritis.

17.5.15.—O. D. injected .15 of 5 ccs, ditto, staph. aur. Intravenous injection .015 of 10 ccs. ditto bac. coli, treated as on 12.5.16.

23.5.16.—O. D. injected .1 of 3 ccs. ditto staph. aur., heated 60° C. half an hour. Intravenous injection .2 of 3 ccs. ditto B. coli, heated 60° C. half an hour.

25.5.16.—O. D. acute iritis.

Aq. h. O. D. and blood examined.

Result :—Aq. h. control in lower dilutions inhibiting complement

	staph. a.	coli a.
Aq. h. 1 in 20	—	$+^3$

(not tested beyond).

Blood control undil. inhibiting complement.

	staph. a	coli a.
,, 1 in 50	—	$+^3$

(not tested beyond).

[*]31.5.16.—Aq. h. O. D. and blood examined.

	staph. a.	coli a.
Result :—Aq. O. D. 1 in 2	—	$+^3$
,, 1 in 80	—	$+^3$
,, 1 in 200	—	$+^2$
(not tested beyond).		
Blood 1 in 5	—	$+^3$
,, 1 in 500	—	$+^3$
(not tested beyond).		

7.6.16.—O. D. acute secondary glaucoma.

Aq. h. and blood examined.

Result :—Aq. h. controls inhibiting complement.

	staph. a.	coli a.
Blood 1 in 10	—	$+^3$
,, 1 in 100	—	$+^3$
,, 1 in 1800	—	$+^2$

(not tested beyond).

18th Experiment.

12.5.16.—O. D. rabbit No. 18. injected, .15 of 10 ccs. emulsion agar slope (overnight) b. coli, heated 63° C. half an hour.

Intravenous injection .2 of 10 ccs. emulsion agar slope (overnight) st. aureus, heated 63° C. half an hour.

13.5.16.—O. D. acute iritis.

17.5.16.—O. D. injection .15 of 5 ccs. ditto B. coli. Intravenous injection of .15 of 10 ccs. ditto staph. aureus.

23.5.16.—O. D. injection .15 of 3 ccs. ditto B. coli, heated half an hour 60° C. Intravenous injection .2 of 3 ccs. ditto st. aureus, heated half an hour 60° C.

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[*] Proportion of coli amboceptor in aq. h. and blood between 1 in 6 and 1 in 7.

*31.5.16.—Aq. h. O. D. and blood examined.

		staph. a.	coli a.
Result:—Aq. h.	1 in 2	—	+
,,	1 in 40	—	+
,,	1 in 80	— —	—
Blood	1 in 5	—	+
,,	1 in 120	—	+
,,	1 in 500	—	— —

6.6.16.—Aq. h. O. D. and blood examined.

		staph. a.	coli a.
Result:—Aq. h.	1 in 2	—	+
,,	1 in 8	—	+
,,	1 in 200	—	+
	(not tested beyond).		
Blood	1 in 10	+²	+
,,	1 in 100	—	+
,,	1 in 180	—	—

15.6.16.—Aq. h. O. S. at various dilutions neg. with both ants.

19th Experiment.

3.6.16.—O. D. rabbit No. 19, injected .1 of 10 ccs. emulsion agar slope (48 hours) B. coli, heated 60° C. half an hour. Intravenous injection .1 of 10 ccs. ditto st. aur. heated 54° C. half an hour

7.6.16.—O. D., injected .1 cc. B coli (see above). Intravenous injection .1 cc. st. aur. (see above).

†14.6.16.—O. D. very acute iritis
Aq. h. O. D. and blood examined.

		staph a.	coli a.
Result:—Aq. h.	1 in 30	—	+
,,	1 in 90		[illegible]
Blood	1 in 30	+¹	[illegible]
,,	1 in 60	[illegible]	[illegible]

‡20.6.16.—Aq. h. O. D. and blood examined.

		staph. a.	coli a.
Result:—Aq. h. O. D.	1 in 4	[illegible]	+
,, ,,	1 in 32	—	+
,, ,,	1 in 96	— —	—
O. S. undil.		—	—
,,	1 in 5	—	+
,, ,,	1 in [illegible]	—	—
Blood	1 in 5	[illegible]	+
,,	1 in 30	—	[illegible]

20th Experiment.

3.6.16.—O. D. rabbit No 20, injected .1 cc. st. aureus (see experiment 19). Intravenous injection .1 cc. B. coli (see experiment 19).

7.6.16.—Above injections repeated.

8.6.16.—O. D. ant. ch. full of exudate—no aq. h. could be withdrawn.

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*Proportion of coli amboceptor in aq. h. and blood between 1 in 3 to about 1 in 5 (compare experiment 17).

†Proportion of coli amboceptor in aq. h. and blood higher than 1 in 2 (compare experiment 17).

‡[illegible]

*20.6.16.—Aq. h. O. S. and blood examined.

	staph. a.	coli. a.
Result:—Aq. h. O. S. Undil.	—	—
" " 1 in 2	—	$+^1$
" " 1 in 5	—	—
Blood 1 in 10	—	$+^3$
" 1 in 50	—	—

Excluding the syphilitic cases, in which the nature of the infection was not definitely ascertained, the following table groups together the above results. The table also excludes those cases in which, from any cause, the results were not satisfactory.

Nature of Experiment	No. of Cases	Positive result demonstrated	Positive result indicated	Indefinite result.	Negative result.
Aq. h. examined for amboceptor produced in response to eye infection	12	8a	1	—	3b
Blood examined for amboceptor produced in response to eye infection	10	6	1	—	3b
Aq. h. examined for absolute preponderance of amboceptor produced in response to eye infection, in cases of co-existing general infection	7	4c	—	—	3c
Aq. h. examined for relative preponderance of ditto		2	3	2d	—

a One of these refers to an uninfected aq. h. in a case where the infected could not be withdrawn.

b These three cases are identical.

c The four positive cases are those in which the more active amboceptor-producing organism was employed, the three negative those in which the weaker was employed. This result without this information would tend to be misleading,

d These cases are indefinite, because no amboceptor being detected in the aq. h., the proportion in aq. h. and blood could not be estimated. It should be noted that in one of these cases the amboceptor was also absent from the blood, and in the others was only detected at a low dilution.

Summary of Conclusions.

1. That these experiments demonstrate the formation of an amboceptor, produced in response to an intra-ocular infection, to be mainly due to general cellular activity: that, therefore, in the majority of cases of uveitis, the examination of the aqueous humour by the "fixation complement" method has no practical diagnostic value not also possessed by a similar examination of the blood.

2. That these experiments indicate in cases of an intra-ocular inflammation co-existing with some other infection elsewhere, a relative, and in some instances absolute preponderence in the infected aqueous humour, of the amboceptor produced in response to the ocular infection. Further investigations are essential before this knowledge can be practically utilized.

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*Proportion of coli amboceptor in uninfected aq. h. and blood between 1 in 4 to 1 in 24 (compare experiment 19).

3. That researches on the formation of amboceptor in chronic inflammations are necessary before we can argue that these conditions, indicated in acute uveitis, are in any way similar to those existing in chronic uveitis.

4. That the "fixation complement" method as a practical aid to diagnosis in general deserves far greater attention in this country than it receives. The variability of the presence of amboceptor is one of the chief drawbacks to its more universal application. Further researches will undoubtedly throw much light upon this problem.

Finally, I turn to perform a duty which is at the same time a great pleasure—namely, to express my thanks to Prof. O'Sullivan and Dr. Wigham, who have both kindly given me every facility for carrying on my work in the Laboratory of the Pathology School, T.C.D., and who have on many occasions, together with Dr. Speares and Mr. White, helped me with useful suggestions.

I also desire to thank the staff of the Royal London Ophthalmic Hospital for their kindness in allowing me the use of their valuable library; and the staff of the Lister Institute, London, for their various courtesies.

In conclusion, I feel it to be my especial privilege as first holder of the Montgomery Lectureship, to express my gratitude to its founder, the late Mr. Montgomery, assistant ophthalmic and aural surgeon for many years in the Royal Victoria Eye and Ear Hospital, Dublin. I know well that this feeling of gratitude is shared by my audience, many of whom knew him personally, and some few of whom worked beside him. I know, also, that it must be shared by all members of our profession anxious for the advance of medical knowledge.

Mr. Montgomery was a man with many and varied scientific interests. In ophthalmology he excelled chiefly in its optical and physical branches. Of his personal qualities I feel it unnecessary to speak; for the fact that at his death he founded this generous research scholarship will tell the scientific world far more eloquently than I, or any of my successors could hope to do, of the zeal and enthusiasm of his life-work.

REFERENCES.

1. **Arkwright**.—[illegible], 1911.
2. **Axenfeld**.—[illegible]
3. **Besredka**.—[illegible], 1914.
4. **Bierbaum and Berdel**.—*Ibid.*
5. **Browning**.—[illegible], 1912.
5a. *Ibid.*, 1915.
6. **Brownlie**.—[illegible], 1915.
7. **Bryan**.—[illegible], 1912.
8. **Calderaro**.—[illegible], 1915.
9. **Coats**.—[illegible], 1912.
10. **Deane**.—[illegible], 1910-11.
11. **Dudgeon**.—[illegible], 1914.
12a. **Elschnig**.—*Archiv. f. Ophthalmologie*, 1911.
12. **Elschnig**.—[illegible], 1913.
13. **Fermen and Dantreille**.—[illegible], 1913.
14. **Franke**.—[illegible], 1912.
15. **Fraser**.—*Zeitschrift f. Immun. u. exper. Therapie*, 1914.
16. **Frenkel and Nicholas**.—THE OPHTHALMOSCOPE, December, 1915.
17. **Fuchs**.—v. Graefe's *Archiv. f. Ophthalmologie*, April, 1913.
18. **Gebb**.—[illegible], 1913.
19. **Hastings**.—[illegible]
20. **Hektoen**.—[illegible], 1915.
21. **von Hippel**.—[illegible], 1913.
22. **Kolmer**.—[illegible]
23. **Kritschewsky**.—*Zeitschrift f. Immun. u. exper. Therapie*, 1914.
24. **Leber**.—[illegible]
25. **Miyashita**.—[illegible]

26. **Morax and Loiseau.** *Annales de l'Institut Pasteur*, 1911.
27. **Ormond.** *British Medical Journal*, October, 1912.
28. **Parsons.**—" The Pathology of the Eye."
29. **Plotz. Olitsky and Baehr.** –*Journal of Infectious Diseases*, 1915.
30. **Prinzing.**—*Zeitschrift f. Immun. u. exper. Therapie*, 1913.
31. **Rados.** *Ibid.*, 1913.
32. **Rosenthal.** *Ibid.*, 1912.
33. **Salus.**—*Archives f. Ophthalmologie*, 1910.
34a. **Schieck.**—*Zeitschrift f. Chemotherapie*, 1912.
34b. **Schieck.**—*Berichte u. Heid. Ophth. Gesellschaft*, 1907.
35. **de Schweinitz.** - *International Congress of Medicine*, London, 1913.
36. **von Szily.** – *Ibid.*

[THE END.]

DOUBLE CATARACT FOLLOWING ELECTRIC SHOCK.

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The following case is of some interest, as it illustrates an unusual mode of formation of cataract :—

Case.

E. B. R., æt. 32 years. In September, 1913, whilst engaged on his work, which was that of an electrical engineer, he came in contact with a "live" wire, and received a current at approximately 11,500 volts. It is not quite clear at what part of the body he received the discharge, but he was rendered unconscious and severely burned on the head, as well as on other parts of the body. He was in a very critical and serious condition for many days, and was quite unconscious for some days. There was a large burn of the skin on the top of the head. After some time he gradually recovered, but it was several weeks before he was able to walk. Meanwhile the burn on the scalp had extended in depth and had exposed the bone, and a quiet necrosis set in This went on for over eighteen months. I first saw him in March, 1915, *i.e.*, eighteen months after his injury. He complained then that the sight in his right eye was becoming misty. His vision was R. 6/36, L. 6/12, and he could read Jaeger No. 4 with each eye. The refraction of the left eye was about + 1.5 D.sph., that in the right eye could not be made out, as the reflex was too dull.

On examination, there were numerous dot-like opacities scattered about the right lens and at different depths, but there were no spokes and no large opaque masses ; the fundus could be seen indistinctly and appeared to be normal. The left lens also showed a few fine dot-like opacities scattered about. The scalp was healing, a small sequestrum having been removed.

By July, the right lens had become quite opaque and of a grey colour. On focal examination, the lens could be seen divided up into sectors. The anterior chamber was shallow. The vision of the left eye was still 6/12, but the dot-like opacities were much more numerous, especially so towards the posterior pole of the lens. At the end of September, the vision of the left eye was 6/36, the anterior chamber shallow, and the lens more definitely opaque, no details of the fundus being observable.

In December, vision in the left eye was reduced to counting fingers at 2 feet, and the right cataract had become practically mature. The right lens was removed by simple extraction on February 11th, 1916. There was no nucleus in the soft *débris* which was evacuated. Neither the operation nor the subsequent convalesence presented any difficulties. On May 11th the left lens was removed by the same method as the right, but some of the sticky lens matter remained obstinately behind, and as there was a good deal of vitreous tension, I did not risk washing out the anterior chamber. Two days after the operation, there was a little iritis, but this soon quieted down under atropine, and after this convalescence was uneventful. The ultimate result has been good, for at present his vision is R.E. c.+12.5D.Sph.=6/12. L.E. c.$\frac{+12\text{D.Sph.}}{+1.5\text{D.Cyl.}}$ 50° =6/6. +2D.Sph. added gives Jaeger No. 2 with both eyes.

Remarks.

The cases of cataracta electrica are not rare, for a good many have been published, still they are not very common. They all present the same features, *viz.*, the dot-like opacities, although many show lines as well.

With respect to the mode of formation, they nearly always, if not invariably, follow in those cases where the discharge of the current has passed through the head, as happened in the case above.

Two points are to be noted in this case.—(1) The position of the opacities; these were scattered about the lens at various depths. In this respect it differs from the usual type, for the opacities are usually found near the anterior capsule of the lens, and this has led to the statement that this type of cataract is the result of destructive changes in the capsular epithelium. (2) The long period which elapsed before cataractous changes produced definite symptoms of loss of visual acuity.

The following is a list of some cases of cataract due to electric burns which have been recorded during the past five years:—

1. **Terrien, F.**—*Archives d'Ophtalmologie*, 1908.
2. Roche. [illegible]
3. Le Roux [illegible]
4. Robinson. [illegible]
5. **Freysz-Winterthur, H.**—*Zeitschr. f. Augenh.*, Vol. XXIII, p. 188.
6. Bichelonne [illegible]
7. Dalen, A. [illegible]
8. Komoto. [illegible]
9. Grimsdale and James. [illegible]
10. **Lauder, E.**—*Ophthalmology*, Vol. X, p. 251.
11. Posey, W. C. [illegible]

EGYPTIAN OPHTHALMIC HOSPITALS AND THE WAR.*

[illegible] F. MacCallan, F.R[illegible].

[illegible]

[illegible]

THE ophthalmic hospitals of Egypt have played a part in the medical arrangements for the care of sick and wounded from the military operations at the Suez Canal, at Gallipoli, and at Salonica.

It is desirable to explain that the ophthalmic organization consists of fourteen well-built permanent hospitals and six travelling hospitals. Each [illegible]

[illegible]

diplomas in general medicine and surgery at the government medical school in Cairo. Each travelling hospital includes a large operation tent completely equipped with ophthalmic instruments, aseptic operation and dressing tables, large autoclaves for the sterilization of dressings, and water sterilizers.

In addition to the ophthalmic hospitals I had at my disposal five travelling hospitals* of fifty beds apiece for the treatment of ankylostomiasis, the organization of which was entrusted to me by the late Lord Kitchener. Each of these travelling hospitals had its full complement of doctors, clerks, quarter-masters, and orderlies.

The permanent ophthalmic hospitals at five of the capital towns of the Egyptian Delta were brought into use at the beginning of May, 1915, to assist in the provision of accommodation for the large number of sick and wounded soldiers who were sent back from the Gallipoli peninsula. The treatment of these men was carried out by the Egyptian medical officers under the superintendence of my deputy, Major Oulton, R.A.M.C.

It was, however, to the travelling hospitals that the main work fell.

It was found in January, 1915, that two clearing hospitals were required in the Suez Canal zone for Turkish wounded prisoners. Three ophthalmic hospitals were transferred at 24 hours' notice from various parts of Egypt to Ismailia and Suez; the additional instruments required for general surgery being supplied by the stores of the Department of Public Health. The hospital at Ismailia was commanded by Major Thomson, R.A.M.C., and that at Suez by Major Oulton, R.A.M.C., both of the Department of Public Health.

These hospitals received all the Turkish wounded prisoners captured during the spring of 1915. When serious military operations came to an end in May, 1915, they were transported to Port Said, to afford accommodation for British wounded from Gallipoli. The composite hospital was commanded by Major Heron, R.A.M.C., of the Department of Public Health, from May until October.

At the end of April, the French military authorities required accommodation for Senegalese troops wounded at Gallipoli, and I transferred to Zagazig accommodation for 150 wounded. The tents were pitched on a piece of ground immediately adjoining the permanent ophthalmic hospital, which gave admirable facilities for the performance of operations. This hospital was at work from May until the end of June.

On May 8th, a project which I had outlined to Col. Sir David Semple, A.M.S., the Director General of the Department of Public Health, to organize a general hospital under canvas for British wounded at Alexandria was approved by D.M.S. the Forces in Egypt. For this purpose ophthalmic hospitals were removed from various places in Egypt, and were sufficiently ready to receive British wounded patients on May 23rd. The hospital was thoroughly equipped with the necessary surgical instruments by the central stores of the Department of Public Health, and had a complete installation of electric light, X-rays, and telephones. It at first consisted of 200 beds, which later were increased to 400, and later still to 550. These increases were effected by bringing the *personnel* and equipment of hospitals which were treating ankylostomiasis in various parts of Egypt to reinforce the original hospital.

The hospital was divided into three sections, two of which had each a large Swiss cottage tent lined with white for operations, and another similarly and fully equipped for dressings; the third section of 150 beds was reserved for dysentery cases.

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*Two of the best equipped travelling ophthalmic hospitals were founded and endowed in 1904 by the Right Hon. Sir Ernest Cassel.

There was, in addition, an isolation section of 50 beds available for pyrexia of unknown origin. As soon as acute specific fevers were diagnosed, they were transferred to a special military infectious diseases hospital.

A word as regards the site should be added. The hospital was pitched on the cliffs at Glymenopoulo Bay, Alexandria, with the sea on two sides, the western and the northern, and was probably the most healthy place in the whole of Egypt.

The *personnel* of the hospital comprised myself as commandant and principal surgeon, Lieut. Kennedy, R.A.M.C., as my assistant, and a staff of twenty-four Egyptian surgeons. Three of the surgeons having had experience as house surgeons at the Government Hospital, Cairo, were placed in charge of the three sections of the hospital. With a proportion of one surgeon for each twenty-five beds it is obvious that very careful dressings, frequent when necessary, could be carried out for all wounded. No nursing sisters were employed, reliance being placed on the high proportion of medical officers and the numerous trained Egyptian hospital attendants. The comfort and well-being of the patients, however, was greatly enhanced by the indefatigable labours of the lady almoner, Mrs. Peckitt, of the Voluntary Aid Detachment, and a small staff of lady helpers. Very great assistance was provided by the Alexandria branch of the British Red Cross Society, which was organized by Sir Armand Ruffer, C.M G.

The clerical work of preparation of the usual army returns was carried out by my Egyptian clerks, in a manner which earned the commendation of the military authorities.

The site of the hospital at Alexandria, although ideal for the summer, was in too exposed a situation for winter work. The Director of Medical Services approved of its transfer to Cairo from October 17th, and it was re-opened there on November 8th. The Port Said camp was moved up to afford additional accommodation, bringing up the available beds to 650.

The hospital was pitched on an excellent site on the banks of the Nile, with a magnificent view of the citadel across the water. It was organized in four sections, each of which was self-sufficient with its own administrative medical officer, surgeons, operation and dressing tent, kitchen and dining huts. There was, in addition, an isolation section where all cases of pyrexia of unknown origin were placed.

At the end of January, the military hospitals being fully able to accommodate the reduced number of sick and wounded, my hospital was brought to an end by the evacuation of the remaining patients. The total number of cases treated was 5,965, of which about half were cases of wounds and about half were cases of sickness. The number of operations performed was 639.

In a consideration of the surgical work of the hospital it must be noted that, as far as possible, the more lightly wounded cases were sent by the military authorities to this hospital, which was known as the Public Health Department Hospital. The work done may be recapitulated as follows:—

1. Two clearing hospitals for Turkish wounded prisoners.
2. Hospital of 150 beds for Senegalese.
3. Tent hospital of 550 beds at Alexandria which was later transferred to Cairo and the number of beds increased to 650.
4. Use of five permanent ophthalmic hospitals for wounded.

Notes of 146 cases of wounds of the scalp, with or without injury to the underlying bone, have been collected by Dr. Rasheed, Inspector of Ophthalmic Hospitals. They may be classified as follows:—

(1) Head wounds with fundus changes, 35. (2) Head wounds with severe headache and no fundus changes, 20. (3) Head wounds with no headache or

other symptoms, 70. (4) Wounds in the region of the forehead, no symptoms, 21.

In the last two categories no ophthalmoscopic examination was made.

The only class which needs consideration is that in which fundus changes were found. These cases may be sub-divided as follows :—

(1) Cases in which papillœdema was present, 11. (2) Cases in which the optic disc was ill-defined, and in which the veins were noted to be engorged ; these cases exhibited no signs of hypermetropia, 17. (3) Cases in which the only fundus change present was a slight engorgement of the veins, 4. (4) Cases in which the discs were ill-defined, and the veins were engorged, and in which varying degrees of hypermetropia were present, 3.

In all except nine cases the condition appeared to be of a temporary nature, and after a period of treatment, the men were discharged to duty as cured. Five of the cases were transferred to a military hospital for operation by the late Col. Sir V. Horsley. Four cases, in which a period of rest appeared to be indicated, as improvement had begun, were sent home to England in hospital ships.

Many of these cases were of extremely slight nature without apparently any exposure of the cranial bones. My object in this brief note is to emphasize the extreme importance of a careful ophthalmoscopic examination in all cases in which there is a head wound of any kind accompanied by headache, whether occasional or persistent. It should be noted that twenty-five of thirty-five cases mentioned above as exhibiting fundus changes were examined by Col. Horsley, who agreed with our description of fundus changes and occasionally made additions to our notes. A further item of importance was that all the cases were classed by the medical officers on board the hospital ships which brought them from Gallipoli to the hospital at Alexandria as walking cases with slight scalp wounds.

AN UNUSUAL FORM OF LOCALIZED TRANSITORY TRAUMATIC OPACITY OF THE LENS.

BY

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Case.

THIS is a case of contusion of the left eye in a boy, aged 13 years, caused by a stone thrown at him by another boy.

It was about twelve hours after the accident that his mother brought him to the hospital on the morning of July 16th, 1916, and, on examination, I found :

R.E.—Normal. L.E.—A small abrasion somewhat below and to the inner side of the lower orbital margin. Slight bruising of the lids. Sub-conjunctival hæmorrhage in the lower half of the area between external canthus and limbus.

Pupil vertically oval, semi-dilated, and inactive. Irido-dialysis to the extent of about 3 mm. at the nasal periphery of the anterior chamber.

Lens.—Well-circumscribed, central, circular, superficial grey haze about 4 mm. in diameter.

Fundus details indistinct. V. 1/60. Projection good. T.n.

By way of local treatment the eye was shaded, and a 1 per cent. ointment of atropine and quinine and warm boric fomentations were prescribed.

On the subsequent visits of the patient the following notes were made:—

July 17th, 1916.—A disc-diameter internal to and on a level with the disc, a circular spot of hæmorrhage visible to-day. Retinal œdema.

July 18th, 1916.—The haze in the central area of the lens still continues.

July 21st, 1916.—Pupil well dilated. The central haze in the lens reduced to a ring of opacity, the enclosed area being clear. The fundus, as a whole, better seen to-day. Macular area still veiled, because of the opaque ring in the lens. T.n.

Hydrargyrum c. Creta, grs.ij., three times a day, internally prescribed, in addition to local treatment.

July 28th, 1916.—Lids normal. The grey ring in the lens almost cleared up.

July 31st, 1916.—Pigmentary change in the macula . . . . . . Still an indication of the grey ring in the centre of the lens. V. 3/60 c. + 1D. cyl. axis 90° 6/60.

August 7th, 1916.—Treatment discontinued since last visit. Pupil still dilated. Eye quiet. Lens quite clear. Hæmorrhage cleared up. In the macular area, and for some little distance around, the choroid appears stretched and thin and presents pigment-free reticulate striation, and obvious retinal pigmentary changes. V. as noted. T.n.

Remarks.

In the 12th edition of his *Lehrbuch der Augenheilkunde*, chapter viii, Diseases of the Lens, page 574, Fuchs writes: ". . . . . . . Another kind of transitory traumatic opacity of the lens has been described by Vossius. It occurs after contusion of the eye and consists in a delicate grey ring immediately under the anterior capsule, which corresponds in size and position to the pupillary border. The opacity disappears in one or more weeks; it probably arises because of the rebounding aqueous pressing the pupillary border against the anterior capsule of the lens."

The present case differs from the condition described by Vossius in that the area enclosed by the ring was opaque. The persistence of the grey ring for some time after the disappearance of the rest of the opacity shows that the aqueous in communicating the pressure exerted on it from outside to the lens behind, makes the strongest impression on it just where, in all probability, the pupillary border interposes between the two media, thus lending support to Fuchs' view of the mechanism of production of the opacity. Whether a disc or a mere ring of opacity arises, probably depends upon the severity of the contusion, the severer contusion producing the disc, and the milder, the ring.

In a case like the present one, where the contusion has produced an irido-dialysis, thus affording the aqueous an avenue of escape backwards into the globe, the possibility of actual momentary contact of the anterior capsule of the lens with the back of the cornea should also be borne in mind in connection with the causation of the opacity in question.

My thanks are due to the surgeon of the Free Eye Hospital, Mr. Arthur Zorab, for permission to publish the case.

A CASE OF PUNCTURE OF THE EYEBALL FOLLOWED BY DISAPPEARANCE OF THE IRIS.

BY

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SYDNEY, N.S.W.

I AM prompted to place this case on record by reading of a somewhat similar case by Mr. Sydney Stephenson in the July number of this journal.

Case.

History.—The patient, a man, aged 50 years, was admitted under my care, bringing with him a note from his doctor, stating that he had been struck in the eye by a piece of wood, which had punctured it, and that there was a prolapse of iris.

Condition when seen.—The Sister, who has had many years of experience in the eye wards, told me that, when cleansing the eye a black pigmented mass, which she thought was iris tissue, had presented itself between the lids, and had been removed on a swab. This, unfortunately, was not kept, but I was quite incredulous about it being iris.

On examination, the anterior chamber was filled with blood, so that nothing could be seen. The tension was not perceptibly raised. At the limbus, in the vertical meridian, above, was a ragged wound, about three millimetres in diameter on the surface, but apparently tapering in its depth. There was no iris tissue in it. I should say that the wound opened into the anterior chamber at its angle, but anterior to the ciliary body.

I touched the wound surface with carbolic acid, cauterizing it thoroughly, and then passed a repositor into the chamber, evacuating the aqueous and some blood. No iris prolapse was present, nor did I see anything of any pigmented fragments.

Progress.—Under atropine, a bandage, and rest in bed, the eye quietened down, and, when examined in the dark room some ten days later, when the blood had disappeared, there was no iris to be seen. The anterior chamber was of normal depth, the lens was not subluxated, although it was hazy, and the vision was, as far as I remember, 6/36. The tension was normal. At one part of the periphery was what I am sure were some shreds of iris base.

Remarks.

I regarded the case as one of avulsion of iris, from the appearances, from the early observation of the doctor who sent him in, and from the account given me by the Sister, that on arrival there was a black mass in the wound, and that this mass came away, and that when I saw the case there was no sign of iris prolapse. I presume that the piece of wood had its point entangled in the iris, the bulk of which came away with the wood, leaving some pigmented fragments in the wound, which, in their turn, as I have related, were extruded.

The patient was instructed to return for observation, but did not do so, and has disappeared.

Such cases must be rare.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—THE TOXIC EFFECTS OF THYROID PREPARATIONS.

Standish, Myles.—Retrobulbar neuritis with central scotoma from toxic action of thyroidin. *Transactions American Ophthalmological Society*, Vol. XIV, Part ii, 1916, p. 608.

This communication, by **Standish**, of Boston, Mass., emphasizes the fact that the administration of thyroid is not altogether devoid of danger as regards the eye. That remedy (nowadays a popular one) must, in fact, be added to the already long list of substances, such as tobacco, iodoform, dinitro-benzol, atoxyl, etc., capable of causing retrobulbar neuritis.

Standish has been able to collect from the literature eight cases where the existence of central scotoma or optic neuritis has been attributed to the administration of thyroid, either in medicinal form or under the guise of some one or other of the widely-advertised "anti-fat" nostrums. Of the eight cases brought together by Standish, no fewer than five were reported by Henri Coppez (*Archives d'Ophtal.*, 1900), while C. R. Hennicke (*Klin. Monatsbl. für Augenheilk.*, 1911), E. Snydacher (*Journal American Medical Association*, October 28th, 1911), and Aalbertsberg (*Weekbl. van het Ned. Tijdschr. voor Geneesk.*, Vol. II, No. 22), are responsible for one each.

To these Standish now adds three cases, the facts of which are briefly as follows:

1.—Woman, aged 69 years, affected with a small central scotoma in the left eye and a central scotoma for green in the right eye. R.V. 6/30. L.V. 6/25. Slight swelling the right optic disc, together with some narrowing of the retinal arteries, but no pronounced turgescence of the veins. A case of myxœdema. For fourteen years had taken a five grain tablet of thyroidin three times a day, and for five or six years, one a day. The thyroid was discontinued, and vision improved. The patient died suddenly some ten weeks after she was first seen by Standish.

2.—A man, aged 41 years, whose thyroid gland had been removed, on account of a fibrous tumour, about two years before, had taken a one-half grain tablet of thyroidin before each meal R.V. 1/10. L.V. 8/10. Central scotoma in the right eye for all colours, except dark blue. Limits of the field for white normal as regards that eye. The optic discs were of normal colour, and the retinal vessels were not markedly changed. A few months after omitting the thyroidin, vision became normal.

3.—A well-nourished lady, aged 33 years, complained of sudden loss of vision. With the idea of reducing her weight, she had taken for five days a proprietary medicine, believed to contain as its main ingredient desiccated thyroid. Sight failed after she had taken this preparation for three days. V. 20/200. Both optic discs pale, and retinal arteries small. Central scotoma for all colours. The nostrum was discontinued, and thirty-four days later, R V. 20/40 and L.V. 20/70. The optic discs, however, remained somewhat whiter than normal.

SYDNEY STEPHENSON.

II.—AMBLYOPIA AND AMAUROSIS.

(1) Ruby, Fred McKemy.—An unusual factor in amblyopia. *Ophthalmology*, January, 1916.

(2) Valude.—Unilateral hysterical amaurosis. (Amaurose unilatérale hystérique.) *Annales d'Oculistique*, février, 1916.

(3) Galli Valerio.—A contribution to the study of snow ophthalmia (Contribution à l'étude de l'ophtalmie des neiges.) [illegible] 1916.

(4) Martin, Marcel-Albert.—The diagnosis of monocular amblyopia by the deviation of the amblyopic eye in near vision. (Diagnostic de l'amblyopie monoculaire par la déviation de l'œil amblyope dans la vision rapprochée.) *Recueil d'Ophtalmologie*, avril, 1911.

(5) Kaz, R.—The plain glass in hysterical amblyopia and nervous asthenopia (Das Planglas bei vermeintlicher Amblyopie und nervöser Asthenopie.) *Wochenschrift f. Therapie und Hygiene des Auges*, June 8th, 1911.

(6) Aubineau.—Ocular manifestations of traumatic neuroses. (Manifestations oculaires des "nevroses traumatiques." *L'Ophtalmologie Provinciale*, juillet, 1912.

(7) Weiss, K. E.—Amaurosis fugax caused by spasm of the retinal vessels. (Amaurosis fugax durch Kramp der Retinalgefässe.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(8) Augstein, Carl.—A remarkable case of acute bilateral retrobulbar neuritis with blindness on both sides followed by recovery, on the left side after amaurosis lasting thirty-three days. (Ein bemerkenswerter Fall von akuter doppelseitiger retrobulbärer Neuritis mit Erblindung beiderseits und Ausgang in Heilung, links nach 33tägiger Amaurosis.) *Klin. Monatsbl. f. Augenheilkunde*, February, 1913.

(9) Mathewson, Geo. H.—Two cases of snow blindness. *Ophthalmic Record*, July, 1913.

(10) Van Lint, A., and Kleefeld, G.—Family optic neuritis (two brothers, one sister), thyroid insufficiency. [Névrite optique familiale (deux frères, une sœur) insuffisance thyroïdienne.] *Ann. d'Oculistique*, août, 1914.

(11) Langdon, Maxwell H.—A case of alternating transient monocular blindness, ending in complete loss of vision of the left eye. *Annals of Ophthalmology*, April, 1915.

(1) The case is described by **Ruby**, of a boy, aged 7 years, with 1D. of hypermetropia, and vision of 20/200 which could not be improved by glasses. The only possible cause of the amblyopia was that the boy had been in the habit of standing on his head and hanging by his heels, frequently and for long periods. This had been going on for four years. Alteratives were given, and the antics in question forbidden, with the result that eighteen months later, vision had risen to 20/15. A. J. BALLANTYNE.

(2) **Valude**, of Paris, relates the following case.—A girl, aged 16 years, had no perception of light in her left eye, which was practically emmetropic and free from objective disease, except a slight squint. The amaurosis was said to have existed for two years. Simulation was excluded by the usual tests. Her right eye had full vision, but inverted colour fields. Her pharyngeal reflexes were almost absent, and she had suffered from nervous crises, characterised by loss of consciousness, for periods of about ten minutes, but there was no zone of cutaneous anæsthesia. The girl's blind eye was placed near a giant magnet, after which it was able to read the largest letters of the test type at 3 metres. A simulated operation was then performed on it, after which its vision increased to 1/10; but it could not be further improved, and there was no binocular vision. A curious point was, that with a shade in front of the right eye, the left saw 1/10, but if the shade was replaced by a + 15D. lens, the left eye became blind.

The author explains this last phenomenon as due to the fact that when tested similarly before treatment, the left eye was blind, and considers that it corroborates the opinion of Babinski, that many of the accepted symptoms of hysteria are due to suggestion.

He quotes another case, in which a young man developed hysterical amblyopia after having a foreign body in his cornea, apparently because his friends told him that such an accident would make him blind, and also a case in which blood-stained tears were cured by a simulated operation. R. J. COULTER.

(3) **Galli Valerio** gives an interesting account of an attack of snow ophthalmia, lasting seventeen hours, from which he and a guide suffered after an expedition on the glaciers in July, 1895. The first symptom which they noticed was a greenish mist when the candle was lighted on reaching the hut where they were to spend the night. This was followed immediately by lacrymation, and a feeling as if the eyes were full of needles, with much pain. Next day they had to cross another glacier and drive 12 kilometres along a snowy road, which no doubt aggravated this condition. On reaching his home, Galli Valerio was unable to see any marks on a prescription which he had written. The inflammation in the guide's eyes subsided sufficiently to allow of his going to his home in three days, and he had quite recovered in a month. In six days Galli Valerio was able to read a little, and under injections of strychnine in the temples, on the advice of the late Professor M. Dufour, he had sufficiently recovered in six weeks to attempt to resume microscopical work, but only to find that his eyes would not stand the strain An ophthalmoscopic examination at this period showed slight œdema of the retina and optic disc. An attempt to replace the strychnine by bromide was followed by great aggravation of the symptoms. The strychnine injections were continued for a month, and then gradually abandoned and replaced by nux vomica by the mouth. The author was not able to resume work at night until the autumn of 1897, and since then he has had two attacks of misty vision with vertigo and nausea, one in 1905, and the other in 1908, both while engaged on trying microscopic work. His visual acuity has not been reduced. He believes that his attack was due to removing his snow glasses, owing to their fitting badly, and considers that they should be large enough to extend from above the eyebrows to below the lower orbital margin, and should be darker than those usually supplied. He finds that such glasses do not get misty, and are so comfortable that there is no tendency to move them from in front of the eyes. R. J. COULTER.

(4) **Martin** draws attention to the diagnostic value of the deviation of an amblyopic eye in near vision. He finds that when the difference in the visual acuity is only 1/10, or even less, the eye with lower acuity deviates on the fixation of a near object, and regards the sign as a sensitive and sure indication of unequal visual acuity, and one that may be useful in the demonstration of simulation. J. JAMESON EVANS.

(6) An attempt is made by **Aubineau**, of Brest, to divide the post-traumatic ocular phenomena into painful, visual, and motor.

The first is associated with ocular and periorbital neuralgia, photophobia, epiphora, and cutaneous hyperæsthesia.

The visual symptoms are entirely subjective. They consist of erythropsia, micropsia, diplopia, or monocular polyopia. Amblyopia may be present, and of any degree up to amaurosis. The field of vision often presents concentric contraction.

Under the heading of motor phenomena, less mention is made of pseudo-paralyses, ptosis, blepharospasm, strabismus, pseudo-myopia, astigmatism, and pupillary symptoms.

Aubineau points out that without motor disturbances, there are often symptoms such as accommodative, muscular, and retinal asthenopia. General symptoms of more or less importance are usually present, as headache, sleeplessness, vertigo, palpitation, psychic troubles, rapid exhaustion, and emaciation. The author draws a distinction between the retinal asthenopia of neurasthenics, who in spite of emmetropia or corrected myopia are unable to use their eyes for their ordinary occupation, and the hysterical, who manifest somatic phenomena, and an extraordinary suggestibility.

The duration of the ocular troubles is variable, and the same remark applies to prognosis, which is influenced by age, state of the cerebral circulation, chronic intoxications, etc.

(7) **Weiss**, of Schwäb-Gmünd, has had the almost unique experience of actually observing spasm of the retinal arteries in a case of transient amaurosis. He noted the emptying first of the arteries, and then of the veins, which eventually left the vessels as yellowish-white strands. The optic disc became absolutely white. The veins remained full at a certain distance from the disc. After about half an hour, the vessels began to refill, first the small atypical cilio-retinal vessels, then the veins, and, finally, the large arteries. Eventually, the appearance of the fundus became normal. One eye was completely amaurotic from optic atrophy caused by a perforating injury of the orbit. T. HARRISON BUTLER.

(8) The patient, who came under the notice of **Augstein**, of Bromberg, was a healthy man, 38 years of age, whose only previous illnesses had been a nose and middle-ear affection on the left side. Three weeks before his first examination, severe left-sided headache set in, and a few days later, rapidly increasing loss of vision in the left eye. The vision of the right eye was found to be normal, while in the left there was only slight form perception in the upper nasal quadrant of the field. The fundi and discs were normal. The sphenoidal and ethmoidal sinuses were opened, but nothing pathological was found. In the further progress of the affection light perception was abolished in the left eye, while in the right there was a large relative central scotoma and shrinkage of the periphery of the field, most marked at the temporal side. When things were at their worst, the right eye was all but amaurotic. After total blindness of the left had lasted for thirty-three days, light perception began to return, and in the course of three or four months, vision in the right eye was 5/4 with normal field, and in the left 5/5 with only slight narrowing of the lower temporal part of the field. The only ophthalmoscopic lesion was a trifling pallor of the temporal half of the left disc.

The ætiology of the case is obscure. Syphilis was excluded by the history, the general examination, the negative Wassermann, and the failure of mercury, iodides, and salvarsan to influence the course of the affection. The author points out that while multiple sclerosis, myelitis, disease of the nasal sinuses, rheumatism, and sudden losses of blood are supposed to account for a certain number of cases of acute retrobulbar neuritis, in two-fifths of all cases no cause can be found. Some authorities believe that in the majority of these cases multiple sclerosis develops at a later stage. As regards the pathology, some attribute the neuritis to the direct action of bacteria, others to the effects of toxins, and, considering the important *rôle* played by auto-intoxication in many diseases, he suggests that some of these obscure cases may result from that process. The great affinity of the papillo-macular bundle for toxins is well known, and he thinks this a more important factor than the position of the bundle in the nerve or its relation to the nutrient vessels. Even in multiple sclerosis, he looks upon the retrobulbar neuritis as toxic in its nature. In this case the inflammation was apparently interstitial, since it is unlikely that such a complete degree of recovery could have ensued after destruction of the nerve fibres themselves. A notable fact in the period of onset was the absence of all pain on movement or pressure, and on this Augstein bases the belief that the lesion was entirely intra-cranial. A. J. BALLANTYNE.

(9) The two cases reported by **Mathewson,** of Montreal, showed, in addition to the well-known congestive and œdematous condition of the face, lids and conjunctiva, shallow ulcers near the centre of the cornea in each eye. The area involved corresponded with that part of the cornea exposed to the glare of the snow through the partly closed lids. J. JAMESON EVANS.

(10) **Van Lint** and **Kleefeld,** of Brussels, in an interesting paper, record the cases of one sister and two brothers who developed optic atrophy about the age of puberty. The disease differed from Leber's family optic atrophy, as (1) there was no history of defective sight in other members of the family; (2) the alterations in the fields of vision consisted in peripheral contraction without central scotomata; and (3) one of the patients was a female. The patients and several members of their family suffered from myxœdema, and the authors consider that the ocular condition was due to hypothyroidism. Examination of the patients' urine showed in all three cases the modifications in the dislocation of the nitrogenous molecule which have been described by Professor Slosse, of Brussels, as characteristic of hypothyroidism (increase of purins as compared with uric acid, deficient formation of urea, and increased ammonia and unclassified nitrogenous substances) Treatment with tabloids of thyroidine was followed by reduction of the urinary abnormality and definite improvement in the vision, with enlargement of the fields. The article contains many details which cannot be reproduced in an abstract.

R. J. COULTER.

(11) **Langdon,** of Philadelphia, publishes the notes of a case which he had followed for over nine years, and in which attacks of alternating, transient, monocular blindness ended in complete loss of vision in the left eye.

Taking this as a text, he proceeds to discuss the cases of transient loss of vision, and divides them into three categories, *viz.*: (1) those due to a rise in the tension of the globe; (2) those associated with attacks of migraine; and (3) those in which ischæmia of the retina is believed to play a strong part. He discusses the views of the various surgeons who have contributed to the literature of the subject, and then sub-divides the last of the above three classes into two groups: (*a*) the larger one in which the first attack occurs in advancing life, and is associated with signs of general cardiac, vascular, or renal trouble; and (*b*) the much smaller one, in which the victims are young people, who present no obvious objective signs of disease. In the latter, he thinks that the mischief is "due to some congenital anomaly in the vaso-motor mechanism," associated with "some process producing spasm, through the ill-arranged nervous control, . . . either reflexly . . . or by toxic action."

Far the most interesting part of Langdon's communication lies in the last page, in which an account is given of a series of experiments made on an anæsthetised dog. By means of stimulation of the vagi, and of the administration of amyl nitrite and nitroglycerine used in turns, the systemic blood pressure was profoundly lowered; then by the use of adrenalin it was markedly raised, and, finally, still more profoundly depressed by means of venesection. Such changes would have caused severe symptoms of collapse in a conscious animal, and yet the changes in the retinal blood-vessels were scarcely noticeable. Langdon contrasts these observations with the known clinical fact that patients who suffer from transient forms of blindness are free from constitutional symptoms of shock, and concludes that it "seems unlikely that in an individual with normal arteries, a drop in blood pressure alone could empty the retinal vessels, without the production of other symptoms." He therefore rejects as invalid such an explanation of the cases under discussion. R. H. ELLIOT.

III.—THE HYPOPHYSIS.

(1) **Würdemann, H. V.—The eye symptoms of hypophyseal diseases.** *Ophthalmology*, April, 1915.

(2) **Darier, A.—Optic atrophies, the hypophysis and X-rays. Atrophies optiques, hypophyse et rayons X.)** *La Clinique Ophtalmologique*, mars, 1916.

(3) **Calamet, Carlos F.—On a case of bi-temporal hemianopsia caused by tumour of the hypophysis. (Sur un cas d'hémianopsie bi-temporale par tumeur de l'hypophyse.)** *Archives d'Ophtalmologie*, mars-avril, 1916.

(4) **Bruner, William Evans.—A case of pituitary body disease with reference to the effects of early operation.** *Trans. Amer. Ophth. Society*, Vol. XIV, Part ii, 1916, p. 632.

(1) **Würdemann**, of Seattle, gives a summary of the main symptoms of diseases of the pituitary body, followed by brief notes on five cases which have come under his observation. The paper is illustrated with radiograms and field of vision charts. A. J. BALLANTYNE.

(2) The essentials of the article by **Darier**, of Paris, are that optic atrophy may be caused by tumour of the hypophysis, and that tumour of the hypophysis is curable in its early stages by X rays. In support of the latter statement Darier brings forward two cases of his own, one, as he says himself, more conclusive than the other, and refers freely to the work of Béclère and his pupil Jaugeas. The *technique* of the application of the rays is discussed, the shorter route *via* the mouth giving place to the longer route through the skull on account of the great inconvenience of the former. The main indication for treatment is early diagnosis. Symptoms of compression are not a contra-indication, but when there are no such symptoms, radiotherapy is only indicated in the first period. In the second period, clinically indicated by arrest of the hyperosteogenesis, diminution of muscular power, somnolence, cerebral torpor, falling of the hair, dryness of the skin and diminution of weight—a period which corresponds to destruction of the gland—there is no occasion for radiotherapy. The conclusions, which the reviewer gathers are those of Jaugeas, may be given here in full:

"It has been proved by recent very conclusive observations that in certain cases of tumour of the hypophysis methodical radiation of this gland by Röntgen rays has led, in spite of its deep situation and the obstacles in the way, to remarkable improvement in the symptoms, more especially to a diminution, partial it may be, of ocular troubles. These fortunate results are to be explained by the elective sensibility of the gland cells and neoplastic cells in general to the destructive action of Röntgen rays. Outside cases of proved syphilis, amenable to mercurial treatment, there are only two rational indications in the treatment of tumours of the hypophysis. These are surgical removal (*exérèse*) and radiotherapy. On account of the necessarily incomplete and purely palliative action of surgical treatment, radiotherapy should always be preferred to it, or at least given a first trial. Speaking generally, radiotherapy of hypophyseal tumours will have the best chance of success when applied as soon as possible, and in accordance with an irreproachably correct method and *technique*. Hence the importance of very early diagnosis. In the ophthalmic form there will be no chance of improvement of ocular troubles except in cases where optic atrophy has not as yet developed. In cases of gigantism and acromegaly, while radiotherapy can stop the progress of the abnormal skeletal growth, it cannot, of course, cause retrocession of lesions already acquired." ERNEST THOMSON.

(3) **Calamet,** of Montevideo, describes, from Lagrange's clinic at Bordeaux, a fairly typical case of bi-temporal hemianopsia in a woman of 47 years, whose sight had been failing for two years. R.V.=2/10; L.V.=1/10. The line dividing the lost part of the fields of vision from that retained passed exactly through the point of fixation. The optic discs were slightly pale, and the retinal arteries were a little smaller than normal. The patient complained of temporo-frontal headaches, of amnesia, of somnolence, and of sudden attacks of vomiting, which were not always preceded by nausea. Examination by the X-rays showed that the sella Turcica had an antero-posterior diameter of 27 mm., and had undergone considerable change in form. Neither Wernicke's nor Bard's symptom was present. Under radio-therapy, the visual field and the sight improved, as did some of the other symptoms, such as the headache and loss of memory. This happy result was unfortunately not maintained, and at the last visit, the patient's sight appears to have been in a precarious state.

Calamet has a good deal to say about the significance and explanation of the symptoms described by Wernicke and by Bard respectively, but his remarks do not readily lend themselves to abstract. SYDNEY STEPHENSON.

(4) **Bruner**, of Cleveland, Ohio, describes a case of disease of the pituitary body in a male patient, aged 46 years. The early symptoms were of an interesting nature, and the results of surgical intervention were good.

The case is given in abstract below:

The patient had been under Bruner's observation for five years, on account of ametropia and presbyopia. During that period V. (corrected) was 6/5 in each eye. The optic discs, however, were "possibly a trifle gray in the deeper layers." The patient then complained of some difficulty and slowness in focusing, but V. and ophthalmoscopic appearances were as before. A small scotoma for red was found just beyond the fixation point in the right eye, and in the left eye a similar though larger scotoma. Two and one half months later, the patient complained that he required a strong light to see clearly, and the V. of the left eye was 6/6. As regards the left eye, the temporal scotoma for red was considerably larger, that for the right eye remaining much as it was, with this difference, namely, that the lower part of the temporal field of the right eye was blind for red, while the perception of that colour was faint in the upper half of the temporal field. Three months after that, R.V.=6/6, and L.V.=6/12. There was then a small absolute scotoma for white on the temporal side of the fixation point in each eye. An X-ray examination showed the "sella Turcica to be somewhat deeper than normal at the posterior part, and there appears to be some destruction of the posterior clinoid process, suggesting a tumour of the hypophysis."

Some twenty-one months after changes were first found in the fields of vision, the patient was operated upon by the trans-sphenoidal route by Harvey Cushing, of Boston. A "struma," of which many fragments were removed, was found in the sella. Six or seven weeks after operation, V.=6/5, and only a small colour scotoma remained on the temporal side of the fixation point. Eight months after operation, V.=6/5. The fundi showed no change. The small scotomata for red were still present. The field for white was normal on the temporal side.

In the discussion that followed the reading of Bruner's communication, **G. E. de Schweinitz**, of Philadelphia, laid stress upon a form of blurred vision, long antedating changes in the fundus or in the field of vision, as an important sign in disease of the pituitary body. In one patient it continued almost for two years before any change in the colour of the optic disc was noticeable.

SYDNEY STEPHENSON.

IV.—NYSTAGMUS.

(1) Fromaget, H.—Latent nystagmus. (Nystagmus latent.) *Ann d'Oculistique*, avril, 1913.

(2) De Ridder, M. P.—A case of unilateral nystagmus. (Un cas de nystagmus unilatéral.) *Bull. de la Société Belge d'Ophtalmologie*, avril, 1913.

(3) Rutten.—Nystagmic neurosis. *Société Belge d'Ophtalmologie*, 26 mai, 1914.

(4) Ohm.—Upon graphic registration of the movements of the eyes and lids in miners' nystagmus. Zur graphischen Registrierung des Augenzitterns der Bergleute und der Lidbewegungen. *Zeitschrift für Augenheilkunde*, July, 1914.

(5) Schmidt, Peter.—Unilateral nystagmus. Ueber einseitigen Nystagmus.) *Klin. Monatsbl. f. Augenheilkunde*, April-May, 1915.

(6) Wilson, James Alexander.—Nystagmus and allied conditions. *Lancet*, October 23rd, 1915.

(7) Harford, Charles F.—Visual neurosis of miners in their relation to military service. *Brit. Med. Journal*, March 4th, 1916.

(1) **H. Fromaget**, of Bordeaux, published in the *Annales d'Oculistique* of May, 1912, a case of latent nystagmus, *i.e.*, nystagmus occurring in both eyes when either eye was covered, but absent when both eyes were open. He now records three other cases of the condition. The first was associated with convergent concomitant strabismus, the second with paralytic strabismus, and the third with corneal opacities and high myopia. He considers that the fact that he has observed four cases within twelve months shows that the condition is not an exceptional one, and that an attempt should be made to cure it, as it renders those who suffer from it unfit for certain occupations, especially those requiring monocular vision, and might become very troublesome in case of the loss of an eye. He recommends correction of errors of refraction, followed by fusion training, and, failing these, he prescribes smoked glasses in front of the more defective eye, beginning with light shades, and gradually making them darker. Fusion training is

recommended because the author considers that education of the retinal and association paths will be followed by the cure of the latent nystagmus, which, in his opinion, depends on a defect in the same centre, or of another associated and neighbouring centre. R. J. COULTER.

(2) **De Ridder,** of Brussels, describes a case of unilateral horizontal nystagmus in the left eye of a child, aged one year. This condition is rare, only three cases being mentioned in Graefe and Saemisch's Encyclopædia. There was no determinable cause, and Ridder compares it with "spasmus nutans," which affects children at the age of dentition.

H. HAWARD BYWATER.

(3) **Rutten** exhibited a miner affected with violent nystagmus. By pressure upon the head or by movements of flexion of the body general trembling was produced. MARCEL DANIS.

(4) **Ohm,** of Bottrop, registers nystagmus by fixing one end of a lever to the upper eyelid with plaster, the other end possesses a steel style which impinges against a revolving drum covered with the usual smoked paper. The resulting curve combines the movements of the eye and the lid. The fine undulations of the nystagmic movements are interrupted by the coarser curves made by the twitches of the lids. Seven examples of the graphs obtained accompany the letterpress. T. HARRISON BUTLER.

(5) In view of two cases which have come under his own notice **Schmidt,** of Rostock, reviews the literature to ascertain whether unilateral nystagmus belongs to one variety only, or if it is found in all the recognized groups. He comes to the conclusion that all the groups are represented, and he describes all the hitherto published cases of unilateral nystagmus, grouping them according to the various categories, as follows :—

1. Unilateral nystagmus in disease of the central system, 11 cases; multiple sclerosis, 3; after-effects of meningitis, 3; tumour, 2; syringomyelia, 1; fracture of the base, 1; undefined cerebro-spinal disease, 1. The nystagmus may be horizontal, but is more often vertical.
2. Unilateral nystagmus associated with squint, 11 cases. The nystagmus was vertical in all except one case in which the direction was not stated. The squint was convergent in all except 2, 1 divergent, and 1 vertical.
3. Unilateral nystagmus with amblyopia in the nystagmic eye, but without squint, 7 cases. The nystagmus was vertical in all but 2, 1 horizontal, and 1 rotatory.
4. Unilateral nystagmus with head movements (*spasmus nutans*), 6 cases.
5. Unilateral traumatic nystagmus, miners' nystagmus, nystagmus in an albino, experimental nystagmus, etc., have also been recorded.

In many of these cases reported as unilateral a fine nystagmic tremor could be detected in the other eye with the ophthalmoscope, and, in general, it may be said that unilateral nystagmus is merely a variety of the bilateral form. No satisfactory explanation of it has been found.

A. J. BALLANTYNE.

(6) In the first part of this article **J. A. Wilson,** of Glasgow, gives some tabulated statistics of 200 consecutive cases of nystagmus. The cases are grouped under the following headings: age, sex, visual acuity, refraction, time of onset, nature of the movements, associated conditions, such as spasm of eyelids and head shaking, occupations, and heredity. From these statistics Wilson makes certain deductions, not all of which, perhaps, will meet with general acceptance. Under the heading "Occupations" there were 68 school children, 31 housewives, 38 general workers, 3 clerks, 24 miners, 28 infants, while 8 are described as of no occupation. "Defective vision from ametropia," says Wilson, "opacities, fundus changes, albinism, want of light

in the coal mine, also the effect of squint, closure of one eye, and sclerosis of the optic tracts, all operate in the same direction and produce the same results." Again, the author says, "Coal mining in which the safety lamp is employed is generally considered to be the only industry responsible for the production of nystagmus. Under such conditions of feeble illumination, the retina can only receive weak or imperfect images. We cannot speak of miners' nystagmus as an entity by itself; the variation is only in the method of obtaining imperfect retinal images." Speaking of the Report on the Workmen's Compensation Act where it is stated that "we entertain the gravest doubt whether true miners' nystagmus can ever occur in persons other than miners," Wilson takes exception to the designation "true miners' nystagmus" and prefers the expression "nystagmus occurring in a miner."

Dealing with the question of heredity, the author says that in the 200 cases there are 5 of hereditary type, and that he has been able to construct 5 pedigrees composed altogether of 80 individuals. He does not publish these individual pedigrees, but has further constructed a pedigree scheme in which the pedigrees by Nettleship, Niccol, and himself are summarised so as to show the descent. "The line of least resistance in descent is from one sex to the other sex, or crossed inheritance. Unaffected males seldom transmit the disorder, and unaffected females frequently transmit it to their sons, but seldom to their daughters. Hereditary nystagmus is thus to a considerable extent a sex-limited disorder. Myopia is also a sex-limited condition, but the line of least resistance here is from female to female and from male to female. Myopia is a quantitative character and nystagmus a defect or disorder. Neither of them seems to conform to Mendelian laws."

In the second part of his paper Wilson deals with abnormal movements of the orbital muscles allied to nystagmus, and asks whether these throw any light on its ætiology. Such allied movements are jaw-winking, rhythmic closure of the eyelids, cyclic affections of the third nerve. Cases are related and others in the literature referred to. We shall give in his own words, slightly abbreviated, what the author has to say on the subject of the bearing of these movements on the ætiology of nystagmus.

"In most of the foregoing cases" (that is, the cases allied to nystagmus just referred to) "there is defective vision or nerve lesion. In the movements it is the orderly or cortical quality that is wanting and 'movements rather than muscles are cortically represented.' In or near the floor of the fourth ventricle there are many nuclei, and some of these are involved in the production of normal associated movements. . . . If cortical control is in abeyance or relatively enfeebled, then a nucleus may be open to receive impulses from other centres without the presence of abnormal tracts of communication" (such as have been suggested). "Impulses seem to stray into unoccupied tracts, producing muscular contractions that are uncontrolled by their own proper centres and so are involuntary. . . . We find 'jaw-winking' and other spasms of the orbital muscles occasionally associated with nystagmus, and, on the other hand, cases of ordinary nystagmus are frequently associated with spasm of the orbicularis, the sphincter of the pupil, the ciliary muscle and sometimes with ptosis. Do the allied cases throw any light on the mechanism of the production of nystagmus or help us to understand why the absence of, or the imperfection of retinal images produces, or is followed by involuntary movements of the eyeballs, a condition that is aggravated by excitement or attention? In the cases under consideration, the conditions that dispose to spasm of the ocular muscles are: (1) supranuclear nerve lesions, or interruption of cortical control producing paralysis; and

(2) defective vision from ametropia, opacities, cataract, the darkness of the coal mine, etc., or imperfection of retinal impressions sent to the cortical visual centre. . . . There is, probably, developed more or less abeyance in the higher centres with consequent uncontrolled activity in the lower centres. In the hereditary variety ametropia is the rule, but we occasionally find cases with perfectly normal eyes. In all hereditary cases it is probable that there is some defect or peculiarity of brain structure. Nystagmus is met with in many cases of cerebral lesions—congenital or acquired—or mental defect, and in these the higher centres are responsible. It is probably also due to defect in the higher centres when it occurs suddenly in a miner after an accident, or as a terminal manifestation in infectious fevers." ERNEST THOMSON.

7) **Harford** (R.A.M.C.) endorses the view that miners' nystagmus is part of a general nervous ailment, the other symptoms of which may include defective sight, temporary giddiness, photophobia, headache, perverted visual impressions, introspection, and so forth. He suggests that the condition should be carefully studied by the neurologist. He gives details of ten cases met with in soldiers, who were formerly pit workers, and concludes that such men bear the strain of military service badly, and that their presence upon active service may be a source of danger to others. SYDNEY STEPHENSON.

V. RETINO-CHOROIDITIS JUXTA-PAPILLARIS

(1) Appleman, Leighton F.—Retino-choroiditis juxta-papillaris. *Ophthalmic Record*, May, 1914.

(2) Ronne, Henning.—The retino-choroiditis of Edmund Jensen [Ueber die Retino-Choroiditis Edm. Jensen.] *Klin. Monatsbl. f. Augenheilkunde*, April-May, 1915.

(3) Verhoeff, F. H.—A case of syphilitic retino-choroiditis juxta papillaris, with microscopical examination. *Trans. Amer. Ophth. Soc.*, Vol. XIV, Part ii, 1916, p. 508, and *Archives of Ophthalmology*, Vol. XLV, No. 4.

(1) **Appleman**, of Philadelphia, records a case of retino-choroiditis juxtapapillaris (Jensen) or chorioretinitis parapapillitis (Blessig). The left optic disc was swollen, and the swelling extended into the retina in the superior temporal region. Vision was fully up to normal standard, but the fields showed the characteristic notching in the nasal area up to the 10° circle. With the development of vitreous opacities, vision became reduced to 5/21 in the course of a week.

Treatment, consisting of mercurial inunctions, potassium iodide, and diaphoresis, was followed by rapid recovery of vision, but the loss of the nasal field was permanent. J. JAMESON EVANS.

(2) **Rönne,** of Copenhagen, relates two cases of this disease, with black and white illustrations of the fundus lesions and records of the fields of vision. The following are his conclusions from a review of these and previously published cases:—

1. That the macula may be the seat of the affection.

2. That van de Hoeve's statement that the upper temporal field is always spared is not correct.

3. That the nerve fibre defect, which is a characteristic feature of the disease, may be relative instead of absolute.

4. That the affection may readily be mistaken for optic neuritis.

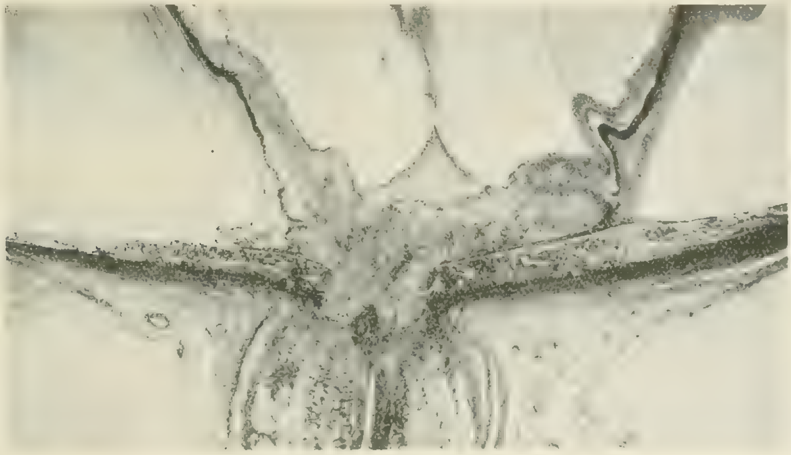
5. That there may be no visible atrophy of the choroid left behind, although the choroid is the primary seat of the disease.

6. That the disease is not uncommon. **Rönne** reckons that it occurs in one out of a thousand eye patients. It is often overlooked, because the clinical picture of choroiditis does not always lead to the examination of the field of vision, which would disclose the characteristic defect and distinguish it from disseminated choroiditis.

He believes that it is sometimes mistaken for tubercle of the choroid, and thus credit for a cure may be given to tuberculin in a disease which recovers spontaneously. A. J. BALLANTYNE.

(3) The interest of this case by **Verhoeff**, of Boston, Mass., mainly centres around the pathological examination of an instance of retino-choroiditis juxta-papillaris, although it probably does not, strictly speaking, belong to the class described by Jensen (*Arch. f. Ophthal.*, 1909, Vol. LXIX, p. 41), as the author himself admits.

The patient, a negro, aged 28 years, suffered from syphilis of the left tonsil in January, 1915, and this was treated for about one month with neosalvarsan and mercury, at the end of which time the tonsil was much improved, and the man discontinued treatment. Some two months later, the patient noticed that the sight of one eye was blurred, and in May, 1915, he sought advice. At that time the left eye, which was inflamed and tender, showed vitreous opacities and detachment of the retina. V.=perception of light. Tension normal. A Wassermann test yielded a negative result. Later, posterior synechiæ and hypopyon developed. Despite mercurial inunctions for three months, the inflammatory condition of the eye increased. It lost perception of light, and was eventually enucleated in June, 1915. About three weeks later, syphilitic lesions of the skin, tongue, tonsils, pillars of the fauces, and lower lip developed, but these had all healed after a further course of mercurial treatment extending over four months.



Syphilitic retino-choroiditis juxta-papillaris (× 8).

The pathological examination showed a localized oval area of thickening near the posterior pole of the affected eye. Its diameter was about 7 mm. In the affected area the retina here and there reached a thickness of 2 mm., and was adherent to the choroid. Elsewhere the retina was separated 1 mm. to 5 mm. from the choroid by serum, and showed numerous hæmorrhages.

On the temporal side the outer surface of the retina was coated with a thick layer of blood. The choroid beneath the retinal lesion was thickened. The pupil was occluded by a delicate membrane. The root of the iris was adherent to the ligamentum pectinatum for about 1 mm. all round.

The histological changes are shown in the appended figure. As may be seen, in the disc and neighbouring retina the normal structures have been almost wholly replaced by granulation tissue, richly infiltrated with chronic inflammatory cells. Although the granulation tissue extends through the lamina cribosa, yet it does not invade the stem of the nerve. Marked venous congestion, and here and there interstitial hæmorrhages and blood pigment. The granulation tissue, which is pushing its way into the vitreous, has broken through the retina to one side of the disc. On the contrary, the choroid beneath the retinal lesion has not been invaded, but it is highly congested and greatly thickened by œdema and infiltration by plasma cells.

The membrane of Bruch is for the most part intact. The infiltration of the choroid ceases at a distance of about 1 c.m. from the optic disc. The retina away from the lesion itself is necrotic and hæmorrhagic, and its outer surface is coated with fibrin. The blood-vessels in the disc and the retinal lesion, especially the arteries, show marked proliferative endovasculitis. The vitreous body is infiltrated with serum, and its posterior part contains masses of necrotic cells (from the retina), fibrin, and pus cells. The orbiculus ciliaris is greatly infiltrated with lymphoid cells. The anterior surface of the iris is covered with a thick vascularised membrane, which passes over the lens. The edge of the iris is united to the lens capsule.

Bacteriological examination negative.

In brief, then, there was found in this eye a granulomatous lesion centered near the margin of the disc, involving chiefly the inner layers of the retina and affecting secondarily the optic disc and the choroid.

Verhoeff concludes by summarising Jensen's original observations upon retino-choroiditis juxta-papillaris, and by pointing out in what respects his own case differs from and agrees with that condition. Jensen believed that the scotoma in the field of vision was caused by the cutting-off of the blood supply of the affected region. Groes-Petersen and other observers, however, think that the scotoma is due to destruction of the nerve fibres in the retinal infiltrate. It was maintained by van de Hoeve that the upper-outer quadrant of the fields always escaped, but Rönne (see abstract above, No. 2) described two instances where the contrary was the case.

In Verhoeff's opinion, some of the cases reported as instances of Jensen's disease were of syphilitic origin. In the majority of cases, however, they are due to an unknown infective agent, which tends to produce single foci in the choroid or retina. When a focus occurs in the retina at the margin of the disc, the condition is classed as one of Jensen's retinitis. On the contrary, when it occurs elsewhere, the condition is regarded simply as chorio-retinitis [illegible] inflammatory [illegible].

SYDNEY STEPHENSON.

VI.—TUBERCULOSIS OF THE EYE.

(1) Jackson Edward. Tuberculosis of the retinal vessels. *T[illegible]* [illegible] Vol. XIV, Part [illegible], 1916, p. 577.

(2) Randolph, Robert L. and Schmeisser, H. C.—A clinical and pathological study of two cases of miliary tubercles of the choroid. *Ibidem*, p. 585.

(1) **Jackson,** of Denver, during the last two years, has seen five cases presenting the ophthalmoscopic appearances of retinal tuberculosis, and in three of these the diagnosis was supported by the results of injections of tuberculin. The ophthalmoscopic appearances he characterises as including vitreous opacities, recurrent hæmorrhages, and enlargement of the retinal veins, together with greyish, rounded spots, smaller than the optic disc, and somewhat like tubercles of the choroid, later becoming vascularized, and ultimately disappearing, always in connection with the larger retinal vessels. In some cases small white spots in the macula (somewhat resembling those of renal retinitis) or optic neuritis may be present. As a terminal condition, retinitis proliferans may supervene. The earlier lesions, at all events, manifest marked focal reactions to injections of tuberculin. Thus, the optic disc may become highly vascular, or hæmorrhages, even large ones into the vitreous, may be observed. The evolution of the retinal lesions is favoured by tuberculin. Jackson points out the necessity of appreciating the ophthalmoscopic picture of retinal tuberculosis, since the diagnosis of the condition must rest upon that and the reactions to specific tests. He also alludes to the occurrence of cases of ocular tuberculosis in which the specific tests yield a negative result, and finds in that fact an added reason for a definite conception of the ophthalmoscopic appearances. Finally, it may be said that none of Jackson's patients showed marked evidence of pulmonary tuberculosis, although in one instance the ocular lesions appeared late in the course of that disease. All of his patients, however, manifested moderate anæmia and some departure from robust health. SYDNEY STEPHENSON.

(2) **Randolph** and **Schmeisser,** of Baltimore, present a study, clinical and pathological, of a couple of cases of miliary tubercle of the choroid, both in children suffering from general miliary tuberculosis, one with and the other without tuberculous meningitis. In one instance both eyes were affected, and in the other one alone. If choroidal tubercle is to be sought, the authors lay stress upon the necessity of employing a cycloplegic (*sic !*), of using an electric ophthalmoscope, and of conducting examinations at least twice a day.

The tubercles found during life were verified microscopically, and tubercle bacilli were demonstrated in the choroidal lesions.

SYDNEY STEPHENSON.

VII.—SPASTIC ENTROPION.

Dimmer, Fr.—The origin of spastic entropion (Zur Entstehung des Entropium spasticum.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

Dimmer, of Vienna, contributes to the explanation of spastic entropion a factor which has been hitherto overlooked.

Most writers on the subject have attributed its occurrence to the action, under certain conditions, of the marginal fibres of the orbicularis muscle. So long as the lid is uniformly supported by the eyeball, and the plane of its edge perpendicular to the surface of the globe, overaction of the orbicularis cannot cause entropion ; but if the lid margin becomes for any reason oblique in relation to the ocular surface, the muscular fibres in the anterior edge of the lid margin are enabled to cause inrolling of the lid. These conditions are favoured by swelling of the bulbar conjunctiva and transitional fold, recession of the eyeball in old age, bandaging, and other factors mentioned.

Dimmer points out that in its earliest stage the entropion may occur only in the outer half of the lid, or in the middle only, and that this excludes the marginal fibres of the orbicularis as the cause. The explanation he offers is that the palpebral portion of the orbicularis draws the skin of the lid towards the palpebral fissure. This is made possible in old age by the increased mobility of the tissues of the lid, and loss of elasticity on the part of the skin, so that the latter does not offer the normal resistance to its displacement.

A. J. BALLANTYNE.

VIII.—IPECACUANHA CONJUNCTIVITIS IN SOLDIERS.

(1) Baillart. On conjunctivitis produced by the instillation of ipecacuanha. (La conjonctivite provoqué par instillation d'ipéca.) *Annales d'Oculistique*, décembre, 1914.

(2) Kalt.—On examination for ipecacuanha powder introduced into the eye. (Sur la recherche de la poudre d'ipéca introduite dans l'œil.) *Annales d'Oculistique*, janvier, 1916.

(3) Fromaget, C. and Harriet.—Conjunctivitis and pseudo-trachoma set up by emetine. (Conjonctivites et pseudo-trachomes provoqués par l'émetine.) *Annales d'Oculistique*, septembre, 1916.

(1) **Baillart**, while in charge of the 12th French Evacuation Hospital, has seen many cases of conjunctivitis in soldiers, produced by the instillation of powdered ipecacuanha. The condition can be recognised by the following characteristics :—

1. It is usually unilateral, and remains so however long its duration, because an attack in one eye is sufficient to get the soldier invalided.

2. There is no secretion-agglutination of the eyelids, and there are no crusts on the roots of the eyelashes.

3. There is frequently slight erythema along the ciliary margin of the eyelid, and occasionally an eczematous condition of the eyelids.

4. There is a pale, dull-red discolouration of the bulbar conjunctiva, most marked in the lower *cul-de-sac*.

5. The conjunctiva of the upper lid is quite normal.

6. There are no complications.

The discoloration of the conjunctiva may persist for several weeks after the instillations of ipecacuanha are discontinued.

The author adds that the practice was introduced by the Colonial troops, and that the French soldier usually carries the powder in his purse, his watch pocket or a fold in his [illegible]

R. J. COULTER.

(2) **Kalt**, of Paris, has devised the following method for detecting the presence of ipecacuanha powder used to produce conjunctivitis.—A piece of gun cotton, the size of a pin-head, held in a forceps, is rubbed along the edges of the eyelids, the roots of the eyelashes, the inferior *cul-de-sac*, and the caruncle, dried in an incubator at 50°C. and dissolved in a watch glass in a mixture of one part of alcohol and two parts of ether. This is allowed to evaporate, when a thin film of collodion is obtained. Some water is poured over this on the watch glass, and the preparation is left exposed to the air for a quarter of an hour, when a piece of the film is removed, and examined in water on a slide. Another method is to pour the collodion obtained by dissolving the gun cotton on to a slide, let it set, and then immerse it in water. The specimen is examined with a microscope (objective 4, ocular 4), when, in addition to remains of cotton wool fibres, the ipecacuanha powder,

if present, is seen in the form of dark masses. To differentiate the starch which forms the greatest part of it, these should be stained with Gram's iodine solution, which colours them blue-black, and makes them show up clearly.

In addition to starch grains, ipecacuanha powder contains a large number of woody fibres which are coloured yellow by iodine. Kalt has been unable to detect these in a preparation from a patient, possibly because they adhere badly to the tissues, and get washed away by the tears.

A microscopic examination of some powders which might be found in the conjunctival sac gave the following results :—

1. Oxide of zinc powder, with conglomerations, not staining with iodine.
2. Talc, lamellar detritus, not staining with iodine.
3. Potato, large egg-shape grains, staining with iodine.
4. Starch, medium-sized grains, almost spherical, staining with iodine.
5. Rice, small grains, often agglomerated into irregular masses.
6. Ipecacuanha, small grains resembling those of rice, never as big as the medium-sized ones which form the great mass of starch, together with woody fibres, staining yellow with iodine. R. J. COULTER.

(3) **Fromaget** and **Harriet** draw attention to a class of case where, for the purpose of escaping from military services, soldiers deliberately set up inflammation of the conjunctiva by the application of powdered ipecacuanha to the eyes. The condition, to which attention was first directed by Bailliart (*Annales d'Oculistique*, décembre, 1914), does not appear to be widely known among medical men, even among ophthalmic surgeons. It presents, however, clinical characters that enable it to be recognised almost at a glance by those familiar with the disease. For example, it is almost invariably unilateral, and affects by preference the right eye. The cutaneous surface of the eyelids is often the seat of a more or less intense eczematous dermatitis. Despite the severity of the conjunctivitis in many instances, secretion is almost always absent. On everting the lower eyelid, the palpebral conjunctiva and that of the *cul-de-sac*, inflamed and œdematous, present a characteristic aspect. The roseate or salmon-hued colouration recalls that of lean ham, and reminds one of that present in cases of spring catarrh, although it is not so white as that of the last-named affection. When the irritant has been applied in small quantities or recently, the redness and œdema are localised to the lower part of the palpebral conjunctiva, but when, on the contrary, a large amount of the powder has been used, or when it has been applied for long, the changes extend to the whole of the conjunctiva. In some of the cases the condition resembles trachoma, and has been operated upon as such, even by experienced men. Small refringent granulations, resembling grains of semolina, are then disseminated over the tarsal conjunctiva and the upper *cul-de-sac*. These pseudo-granulations undergo spontaneous cure in the course of a few weeks, provided the eyes are protected from further irritation, as by the application of a collodion dressing. Diagnostic points are the salmon-like aspect of the conjunctiva, the smallness of the granulations, and the entire absence of corneal complications.

From experiments upon human eyes, the authors conclude that a chemical irritant is the cause of the conjunctivitis, and this they identify as emetine, one of the alkaloids of ipecacuanha. They note that when a 2 per cent. solution of emetine hydrochloride is dropped into the eye, several hours pass before inflammation manifests itself, and a similar remark applies when a morsel of powdered ipecacuanha is employed. SYDNEY STEPHENSON.

IX.—CYSTS OF THE RETINA.

(1) **Derby, George S.—Probable cyst of the retina, with a demonstration of the patient.** *Trans. Amer. Ophth. Society*, Vol. XII, Part III, page 827.

(2) **Brewerton, E. W.—Cysts in the vitreous.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(3) Deutschmann, F.—Recurrent cyst formation in the retina. Ueber rezidivierende Zystenbildung in der Netzhaut. Deutschmann's *Beiträge zur Augenheilkunde*, Part lxxxvii, April, 1914

(1) **Derby**, of Boston, discusses retinal cysts, clinical accounts of which are few. The essential facts of his own case are as follows.—A labourer, aged 40 years, whose sight had been failing for about two years, denied syphilis. R.V.=2/60. Lower and outer part of visual field retained. Transparent separation of the lower half of the retina. Overhanging the temporal edge of the optic disc is a rounded swelling, slightly smaller in size than the papilla, of pear-shaped outline, the apex of which can best be seen with a + 6 D. lens. The tumour, the surface of which showed a few small tortuous retinal vessels, is translucent. A somewhat similar body was to be seen in the outer part of the fundus. L.E.—Almost total separation of the retina believed to be present. SYDNEY STEPHENSON.

(2) **Brewerton,** of London, describes as follows the appearance of cysts in the vitreous in the case of a married woman, aged 49 years, who suffered from irido-cyclitis and pyorrhœa alveolaris. "The cysts are oval in shape, long axis vertical. The larger one is situated rather far forwards and a little to the outer side; the smaller one is in front of the disc, and about the size of the disc apparently, and half the size of the larger cyst. The retina is detached, and the retinal vessels can be seen indistinctly through the cyst walls. The transparency of the cyst walls appears to be equal throughout; there are no dense places, such as would be expected in a cysticercus. During the last two months, the details of the fundus have become slightly indistinct from the presence of vitreous opacities." ERNEST THOMSON.

(3) **F. Deutschmann,** of Hamburg, records a case in which the presence of a large globular retinal detachment in the left eye led several experienced oculists to diagnose intraocular tumour, in consequence of which the eye was enucleated. When the eyeball was dissected, no trace of tumour could be found, nor could anything be seen with the naked eye to explain the ophthalmoscopic picture. This was made clear only by the subsequent behaviour of the right eye, which very soon presented a similar tumour-like mass. This disappeared completely, and periodical examinations detected the appearance and disappearance of retinal cysts of varying size and number, chiefly situated in the region of the ciliary body. Retinal cysts were last seen in October, 1913, and more recently the fundus presented for a time a macular hæmorrhage with central scotoma, and some delicate yellowish spots and lines, with a few pigment spots. General investigation of the patient found signs of a pronounced emphysema and polycythæmia. Microscopic examination of the enucleated eye resulted in the discovery of a cystic degeneration of the periphery of the retina. The cysts were situated in the internuclear layer.

The author attributes the formation of the cysts to an abnormal permeability of the retinal vessels related to the emphysema and the accompanying venous stasis and cardiac embarrassment. The possibility of an angioneurotic basis [illegible] [illegible]. A. J. BALLANTYNE.

X.—OPERATIONS.

28.—Cataract.

(1) **Todd, Frank C.**—A cataract incision leaving an undetached conjunctival flap with bridge of conjunctiva on temporal side. *Ophthalmic Record*, August, 1915.

(2) **Green, A. S. and Green, L. D.**—An operation for secondary cataract. *Ophthalmic Record*, November, 1915.

(3) **Gifford, H.**—Some impressions of the expression of cataract with a sliding conjunctival flap. *Trans. Colo. Ophth. Society*, 1915, p. 158, and *Annals of Ophthalmology*, Vol. XXV, No. 1, January, 1916.

(4) **Corry, M., Major I.M.S.**—Cataract operations, "old" and "new." *Indian Medical Gazette*, April, 1916.

(5) **Corry, M., Major I.M.S.**—Cataract operations, "old" and "new." Part II. *Indian Medical Gazette*, June, 1916.

(6) **Newman, E. A. R., Lieut.-Col. I.M.S.**—The "new" method of extracting cataractous lenses. *Indian Medical Gazette*, June, 1916.

(7) **Török, Ervin.**—Extraction of cataracts in the capsule by a slight modification of the von Graefe method. *Trans. Amer. Ophth. Society*, Vol. XIV, Part ii, 1916, p. 482.

(8) **Vail, Derrick T.**—A discussion of some newer principles in dealing with uncomplicated cataract. *Trans. Amer. Ophth. Society*, Vol. XIV, Part ii, 1916, p. 718.

(1) **Todd**, of Minneapolis, finds a conjunctival bridge of distinct advantage in his cataract extractions: It gives the advantages of the suture without its disadvantages; it prevents loss of vitreous, lessens the liability to sepsis, and prevents subsequent prolapse or incarceration, and insures union; at the same time it allows of easy delivery of the lens, free irrigation, and does not interfere with toilet manipulations. The writer's operation differs from that of Vacher and others, in that the conjunctival bridge, instead of being vertical, is left on the temporal side. He gives detailed instructions for its performance, and describes his method of delivering the lens.

J. Jameson Evans.

(2) **Green** and **Green,** of San Francisco, have devised capsule forceps in which one blade is a knife needle and the other grooved and toothed. The knife blade facilitates the penetration of the membrane, which is then gripped between it and the toothed blade.

In principle the instrument appears to us similar to those devised by Motais (for capsulotomy before extraction) and Landolt (for secondary cataract).

J. Jameson Evans.

(3) **Gifford,** of Omaha, discusses the various conjunctival flaps which have been employed by different operators, in the performance of a cataract extraction, and then proceeds to describe the *technique* he has himself adopted.

He employs a sliding flap, and enters his stitches in such a way as to keep them as far as possible from the deeper wound in the tunic of the eye. Apart from a slight loss of vitreous, the only accident recorded was an infiltration of the flap with blood, which occurred in one case, and proved a very unpleasant complication. The same thing has been noticed in Stanculeanu's clinic. The one disadvantage is the greater expenditure of time, whilst the advantages are that the operation is made more easy; the reasons in favour of this argument are given at length. The use of the flap advocated does not appear to lessen the risk of iris prolapse, and possibly has the opposite effect, if it is drawn too tight. Nor does Gifford appear to be very confident that the sliding flap is a better safeguard against infection than "a large flap well cut with the knife." It is claimed that the great and sovereign advantage it confers is the control it gives over loss of vitreous. He is "convinced that while it may not be worth while to use the sliding flap as a routine measure, it certainly should be used in cases of dislocated lenses, or where, on account of hypermaturity, myopia, nervous temperament, or anything else there is extra risk of vitreous prolapse." R. H. ELLIOT.

(4) **Major Corry's** description of what is becoming known as the "Delhi operation for cataract extraction" requires more than a passing notice. The method is due to a sub-assistant surgeon named Hari Shankar. He claims to be "the first to have made a preliminary conjunctival flap designed in a special way, and combined *successfully* with entire removal of the lens in its capsule."

It is difficult to be entirely original in a cataract operation nowadays. A precisely similar mode of cutting and undermining the conjunctiva was introduced years ago by N. G. Cluckie, as a modification of Czermak's method (THE OPHTHALMOSCOPE, 1909, p. 743). The incision was situated in the lower and outer quadrants of the corneal circumference. Taking the operation as a whole, however, to Hari Shankar is due the credit of having introduced us to a new and possibly valuable development, and although the point is not emphasised in the description, the method forms a very interesting study of the possibilities due to prolonged instillation of cocaine and adrenalin. This is the essential feature upon which all else that is novel depends. Owing to exceptional control of hæmorrhage from subconjunctival vessels, a very long and only partially separated conjunctival covering can be utilised; through the complete anæsthesia obtained, prolonged operation presents little or no trouble; and by the softening of the eye produced, the dangers of loss of vitreous at the time, and of iris prolapse afterwards are minimised.

Corry's account of the instillation of cocaine for an hour before operation, and of instillation of adrenalin for fifteen minutes, needs considerable correction. It is enough to note that the case is considered ready for operation as soon as the pupil is "fairly well dilated." This result can be secured in fifteen minutes or a little more, by the repeated use of 3 per cent. or 4 per cent. cocaine solution, following a single instillation of adrenalin solution.

The conjunctival sac is then thoroughly flushed with normal saline solution, and if the cornea becomes dry, a drop of sterilized liquid paraffin is applied.

"*Conjunctival flap.*—The conjunctiva is seized with fixation forceps just above the corneo-scleral junction, lifted off the eye-ball, and a snip made into it with scissors half an inch above the corneal margin.

"The subconjunctival connective tissue now presents the appearance of a band. This is also snipped into and the conjunctiva pulled further forward. The blades of the scissors are opened and one of them used to separate the loose areolar tissue up to the attachment of the conjunctiva to the cornea.

"The blades of the scissors are again closed and insinuated alternately under the conjunctiva on each side of the cornea, opening the blades so as to form conjunctival pouches in these situations. If the incision in the conjunctiva is not sufficiently long it is enlarged by a vertical cut giving the appearance of an inverted T. If the flap is not sufficiently free the incision is enlarged by a horizontal cut. Care is taken not to make too large an incision in the subconjunctival tissue. If this flap is drawn down over the cornea it will be pulled up again by what Colonel Elliot describes as the check ligament action of the subconjunctival connective tissue.

" It is necessary that the flap should behave in this manner to keep in position afterwards without stitches.

" Hari Shankar's incision is larger than Colonel Elliot's and the flap is undermined at the sides to a greater extent, to allow room for the corneal incision and the exit of the lens.

" This flap requires only 20 to 30 seconds to make.

Incision in Eyeball.

" This should be made within the strip of cornea described so that it will at the same time be corneal and subconjunctival.

" The incision can be made in the following ways :—

(1) Grasp the conjunctival flap with fixation forceps at its outer attachment and pull it a little downwards, insert the knife into the outer pocket ; then, turning it inwards, puncture the cornea at a point between 8 and 9 o'clock in case of the right eye and 3 and 4 in case of the left. Lower the handle of the knife and push the blade into the anterior chamber. Release the outer side of the flap as the back of the knife will keep it in position. Grasp the inner corner of the flap with the forceps and pull it a little downwards to expose the point of counterpuncture between 3 and 4 o'clock in the right and 8 and 9 in the left eye. Transfix the cornea. The back of the knife will now keep both corners of the flap in position.

" Release the inner corner of the flap and grasp it at its middle and complete the incision by lowering the handle of the knife, and at the same time pushing it onwards until the handle is almost touching the outer corner of the wound.

" Then raise the handle of the knife and at the same time draw it out, thus completing the incision.

" This incision can be made downwards when the patient insists on rolling the eye up.

" Generally the patient can be made to look down by giving him a high pillow, and making the chin touch the chest, as the external muscles of the eyeball work in association with the muscles of the neck. This will be appreciated by any one who puts his chin on his chest and tries to look upwards at the same time. So long as the patient's chin is kept in this position, the eyeball remains practically fixed without the help of fixation forceps.

" (2) Insert a keratome into the outer pocket in case of the right or the inner pocket in case of the left eye. Push the point into the anterior chamber either obliquely through the thickness of the cornea or at right angles to it. Insert one blade of the scissors curved on the flat through the wound and pass it in, cutting the cornea obliquely or at right angles, and complete the incision.

" The fixation forceps is grasping the centre of the flap all the time without pulling it down.

" The blade of the scissors does not get entangled in the iris, as air replaces the aqueous if the flap is held up and keeps the cornea and iris apart. If the anterior chamber does not re-form by air on account of loss of elasticity of the cornea from cocaine, one can gently push the blade into the anterior chamber, avoiding the iris at the same time.

"An oblique incision through the thickness of cornea is specially suitable when no iridectomy is desired.

"It is immaterial what instruments are used for making the incision.

"*Iridectomy.*—If desired to perform iridectomy, take iris forceps in one hand and de Wecker's iris scissors in the other. Raise the flap at the site of the corneal wound with the point of the scissors. Grasp the iris with the forceps, pull it up and snip a little off.

"The iris scissors remain partly covered by the conjunctival flap. Now take the fixation forceps again and raise the conjunctival flap, and if any particles of iris remain on the posterior surface of the cornea or the wound, gently wipe them off with a swab or pick them up with iris forceps. If any blood has entered the anterior chamber, now is the time to remove it either by washing or swabbing. If the blood has clotted, pick it up with forceps.

"*Extraction of lens.*—Take a strabismus hook in one hand and fixation forceps in the other. Grasp the conjunctival flap with the forceps and draw it down either inwards or outwards towards the lower part of the cornea, and press. Use the point of the strabismus hook to exert pressure on the other side of the cornea.

"The direction of pressure with both, is backwards and inwards towards the lens. This pressure causes the lens to move in the direction of the resultant of the two forces and it slips upwards through the corneal wound without disturbing the vitreous. If this is not sufficient to lacerate the suspensory ligament keep the fixation forceps still in position without relaxing pressure and move the point of the strabismus hook from side to side about the level of the corneo-scleral junction below. This causes the lens to rotate on its own axis and so lacerate the suspensory ligament. When the greatest thickness of the lens has come out of the wound, relax the pressure and tilt out the lens with the strabismus hook. The fixation forceps prevents the lens from slipping in again. Sometimes intermittent pressure will be found to work better in extracting lenses.

"The following is an easier method of extraction of the lens entire than the one described above.

"After performing an iridectomy, grasp the conjunctival flap, pull it slightly forwards so as to allow air to enter the anterior chamber. The traction on the flap causes a temporary change in the shape of the eye-ball and produces negative pressure in it.

"While the atmospheric pressure steadies the lens, move the strabismus hook from side to side with the point pressing backwards and upwards on the lower part of the cornea.

"The suspensory ligament gets lacerated and air leaks through behind the lens and separates it from the vitreous. Continue the side to side movement following the lens upwards as it emerges through the corneal wound. When the greatest thickness of the lens is through the wound, lower the fixation forceps and, while steadying the lens with it, tilt it out of the wound sideways with the strabismus hook. When this is done pull the flap forwards again, so that the vitreous recedes.

"This method is suitable for all kinds of lenses.

"*Replacement of Iris.*—The iris will be found to have been pushed into the wound at the sides by the outcoming lens. Grasp it with iris forceps and gently draw it away from the wound while you render the anterior surface of the vitreous concave by holding up the flap.

"Now replace the conjunctival flap and dress with a thick pad of wool to steady the eyebrow. If there is danger of vitreous escape at any stage of the operation, don't be in a hurry to close the lids as advised by Colonel Smith

Generally the vitreous can be made to recede by drawing on the conjunctival flap.

"During iridectomy and extraction of the lens an assistant places the whole length of his thumb on the upper lid and presses it and the eyebrow upwards, at the same time with the other hand lifting up the speculum which should have a fairly strong spring.

"Dressings are generally removed the following day and the patient provided with glasses.

"The immediate and ultimate results have been extremely satisfactory in respect of vision and the comfort of the patient. Data shall be published later."

Rupture of the capsule is stated to occur in less than 5 per cent. of the operations, and in these cases the capsule and cortex are said to be easily removed or washed out while the vitreous is kept under control. Prolapse of iris has been found only rarely, "once in several hundreds." If this is so, it removes one of the main objections to intracapsular extraction as practised by Smith. The statement as regards iritis is also "one in several hundreds." But if the patients are discharged often on the day following operation, figures regarding these complications are not at present worth very much.

It seems extraordinary that the advantages of the full use of cocaine and adrenalin have not been more fully explored before now, both in intra- and extra-capsular extraction. If the eye be kept closed between the instillations, there need be no exfoliation of corneal epithelum. During operation the cornea may be moistened by the dropping of sterile fluid, which can be at once soaked up from the lower fornix. In his book on "Cataract Extraction," 1908, pp. 54 and 224, the reviewer drew attention to the benefits arising from the use of adrenalin solution, including reduction of the risk of prolapse of iris in simple extraction. The reduced tendency to prolapse was attributed to dilatation of the pupil at the time of operation, facilitating expulsion of the lens without injury to the iris, and to contraction of the pupil after operation, more surely obtainable with eserine owing to the localising influence of the adrenalin. No reference was made to the softening of the eye which accompanies dilatation of the pupil produced by adrenalin and cocaine—a softening seen in very frequent cupping of the cornea and folding of sclera after operation, a softening which may well last until a conjunctival flap has become sufficiently adherent to prevent prolapse of iris and of vitreous. If the Delhi operation does no more than to emphasize the advantages of this softening, it may prove to have done a real service, both in intra- and extra-capsular extraction. It is possible that in the ordinary operation the full action of cocaine and adrenalin may prove to have certain drawbacks, connected possibly with imperfect coaptation of the wound margins in collapsed eyes, or with the temporary congestion which must follow vascular constriction. But at least the question of operating thus needs complete investigation. H. HERBERT.

(5) It is enough to say of **Major Corry's** second article on the Delhi operation for cataract extraction that it materially weakens the effect of the first.

Assistant surgeon Hari Shankar, who is responsible for the operation, is now reported to prefer downward extraction of the lens in its capsule without iridectomy or iridotomy. If the iris has to be cut, iridotomy is preferred to iridectomy. "Prolapse of iris is prevented by placing a small piece of catgut within the eyeball. It is placed away from the pupil in the iridic angle. Silk or cotton may be used instead of catgut, and if one end is left projecting it can easily be removed next day."

There is much discussion of various complications, the general effect of which is to inspire distrust of the figures, which are promised later, of the results of the operation. It is a pity that whatever good there may be in the Delhi procedure, whatever promise it may hold, should be obscured and buried by such practices and writings. H. HERBERT.

(6) This is an amusing and clever criticism of Major Corry's description of the Delhi operation, entirely justified by Major Corry's extravagant and untrustworthy claims. Hari Shankar's operation is certainly unfortunate in its sponsor. **Colonel Newman**, of Dacca, refers to the use of the conjunctival flap in producing negative intra-ocular tension as novel and interesting. He also refers to the method of lid retraction with the speculum combined with pressure on the brow (drawing up of the brow by the assistant's finger or thumb, the essential part of Smith's method of controlling the orbicularis).

H. HERBERT.

(7) **Török**, of New York City, voices the advantages of the intra-capsular extraction of cataract. At the same time he recognizes that the method must be learned from an expert surgeon, with abundant material at his command, and for these reasons considers that the operation will never be available to the great bulk of ophthalmic surgeons. Attempts to simplify the Smith technic have been made, notably by Stanculeanu, Vard Hulen, and Knapp, and another attempt in this direction is described in the present communication. Details follow.—The incision should embrace about one-half of the circumference of the cornea, and puncture and counter-puncture be made in the limbus. A conjunctival flap should be fashioned. After a small iridectomy has been made, the Kalt capsular forceps are introduced into the anterior chamber with the left hand, and the right hand holding a Daviel spoon, the blades of the forceps are opened, and a fold of the capsule is grasped. The zonular attachments of the lens are loosened by a few lateral and circular movements of the forceps. Keeping the lens firmly in hand with the forceps, the Daviel spoon is applied somewhat below the lower limbus. By means of the two instruments, the lateral movements are kept up, and at the same time traction is exerted upon the lens forward—that is to say, in the direction of the antero-posterior axis of the eye. With the spoon, gentle intermittent pressure is applied to the sclera. These manipulations usually rupture the zonule below, and the edge of the lens slowly emerges from behind the iris. The forceps are then moved towards the wound, and the spoon, the gentle pressure with which becomes continuous the minute the zonule is ruptured, follows the lens, just as in the Graefe extraction, and the lens is delivered with its lower edge first.

Török has adopted the operation described in fifty-three cases, and in thirty-seven of these he succeeded in removing the lens in its intact capsule. In six cases the capsule tore while the lens was engaged in the wound. Török believes that removal of the lens by this method is very simple for anybody who has experience of the usual v. Graefe extraction. The loss of vitreous is likely to occur more frequently in the latter than in the former method. The Kalt forceps cannot be employed in immature cataract.

SYDNEY STEPHENSON.

(8) This thesis by **Vail**, of Cincinnati, presented for membership in the American Ophthalmological Society, deals with some of the newer points in the extraction of cataract. If it contains nothing particularly original, it is, at all events, full of common sense, and may be characterized as a thoughtful and suggestive contribution to ophthalmology.

[illegible] the arguments *pro* and *con*, Vail concludes that a preliminary iridectomy is needless in immature and uncomplicated cataract.

The question of "ripeness" in cataract.—The principle that a cataract must be "ripe" before operation is undertaken amounts almost to a religion in the minds of most ophthalmic surgeons. A patient suffering from immature cataract is given a *placebo*, and operation is postponed from month to year, until, as the author remarks, "what is gained in the imagination that the cataract is getting gradually ready for operation is lost in the actual fact that the prime vigour of bodily and mental health is deteriorating." During the last five years Vail has operated upon forty cases of uncomplicated immature cataract, and from the results obtained, argues that patients who are semi-blind from the condition should be treated surgically without delay. For this purpose he personally inclines to the intra-capsular operation, but does not deny that good results may be obtained by other methods.

Cleansing the eye for operation.—Vail avoids evacuation of the Meibomian glands and swabbing of the conjunctival *cul-de-sac* with moist cotton swabs; in a word, anything likely to injure the protective epithelium of the parts. On the contrary, he advocates douching with a full stream of warm saline, boric lotion, or a weak solution of sublimate, the lids being meanwhile kept apart from one another and from the eyeball by the "Jullundur" speculum. Since adopting this technic, he has had no instance of panophthalmitis among upwards of 500 extractions.

Control of the lids during operation.—Vail advocates the principle that during the delivery of the lens, the eyelids should be held entirely off the eyeball and "hung like a tent," in order to take all weight from the eye, and thereby prevent vitreous from escaping during pressure to deliver the lens.

Treatment of the capsule.—The cystotome should, in Vail's opinion, be relegated to a museum of surgical antiquities. In the capsulotomy operation it is necessary to remove as much of the capsule as possible by means of forceps.

Retained lens substance.—The question of retained lens substance naturally does not arise in the intra-capsular method. As to the other operations, Vail distinguishes between the over-ripe lens, on the one hand, and the unripe lens, on the other. In the former, retained matter is irritating and slow of absorption, whereas in the latter the material left behind is non-irritating and will readily become absorbed.

Time as a factor.—Too much time, as a rule, is consumed by the operation and its preparations, and needless shock is caused thereby, especially to aged or decrepit patients.

Atropine.—Vail regards atropine, except in rare instances, as a positive detriment to the eye at any stage after extraction of cataract.

That the author has the courage of his convictions is shown by the following unambiguous words.—"The time will come when it will be taught that the most favourable form of cataract for operation is the immature, and operators will feel that they are jeopardizing their results by waiting for maturity."

We are bound to say that a close scrutiny of the figures dealing with forty extractions of immature cataract given by Vail, bears out his contention.[*] Thus, the ages of the patients varied from 37 to 79 years. The immaturity of the cataract was such that the optic disc could always be seen with the ophthalmoscope. Vision before operation ranged from 20/40 to 20/200. After operation, Jaeger No. 1 could be read by all but six of the patients; four read No. 2 Jaeger; one read No. 3 Jaeger; and one could not read print at all. As regards distant vision, no fewer than 67·5 per cent. obtained 20/20; 20 per cent. obtained 20/30; 2·5 per cent. obtained 20/35;

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[*] These figures include each and every case of uncomplicated, immature, senile cataract with vision of 20/200 and better, that Vail has operated on since January, 1910.

5 per cent. obtained 20/40; and 2·5 per cent. had no sight, the eye being lost from choroidal hæmorrhage, induced by epileptic seizure following a smooth extraction. SYDNEY STEPHENSON.

29.—Detachment of the Retina.

Thomson, Edgar S.—The surgical treatment of retinal detachment. *Trans. Colo. Ophth. Congress*, 1915, p. 118, and *Annals of Ophthalmology*, January, 1916, Vol. XXV, No. 1.

Thomson, of New York City, is convinced that surgical interference alone offers any prospect of success in the treatment of detachment of the retina. He has not had the slightest encouragement from the use of any form of non-operative therapeutics.

He first gives a brief summary of the history of surgical interference in this condition. Its indications are: (1) the removal of the fluid present, and (2) the formation of adhesions between the retina and the underlying tissues. Any attempt to secure adhesive inflammation is thought by Thomson to be unsound in theory, and opposed in practice to the past teaching of operative experience. The method now advocated is intended for application mainly to recent cases. The evacuation of the subretinal fluid is the main object before the author's mind. It is "desirable, not only to completely drain away the fluid so that the retina may fall back into position, and the vitreous body be restored in volume, but also to secure more or less permanent drainage, so that re-accumulated fluid may not annul the effect of a previously successful operation." The important bearing of the presence of retinal rents on the prognosis after operation is insisted on. Holth's statistics showed this, and also laid bare the fact that flat detachments are the most favourable for surgical interference. Cases where an inflammatory condition of one kind or another exists are considered less serious than those of ordinary spontaneous detachment. Parker's excellent results in three out of eleven cases are mentioned, and it is particularly noticed that he nearly always makes a point of incising the choroid, or the choroid and retina, with a cataract knife, allowing a few drops of vitreous to escape. The *technique* adopted by Thomson was to trephine the sclera, as Parker had done, and then to remove the fluid with a minimum of traumatism. If the removal of the scleral button permits the escape of a large quantity of subchoroidal fluid, and the ophthalmoscope shows that the detachment has subsided, the conjunctival flap is replaced, and the procedure closes; but if the fluid escape is scanty, an aspirating syringe is used and as much fluid as possible withdrawn. In some cases the aspiration is postponed for ten days and performed through the trephine hole and its covering conjunctiva. This produces no reaction, and can be repeated later if necessary.

Thomson thinks that the operation is of very doubtful utility in the face of high degrees of myopia. He mentions the fact that Holth has advocated trephining in high myopia to allow of the shrinkage of the eyeball and the reduction thereby of the refractive error. The results obtained cannot be considered likely to be of much benefit unless by far the greater part of the retina is reattached as an immediate result of the operation. Small recent single detachments, without rents, give the best prognosis after operation. A number of small but important points in *technique* are brought out in the course of the article. The patient is kept in bed until the operative reaction has subsided, but not longer. The author considers that the really important point is the thorough removal of the fluid, and that the position and movements of the patient influence the results but little. R. H. ELLIOT.

30.—Lacrymal Apparatus.

(1) **Prince, A. E.**—An operation for the direct drainage of the lacrymal sac into middle meatus from the standpoint of the ophthalmologist. *Ophthalmic Record*, August, 1915.

(2) **Moulton, H.**—The use of lead styles in the treatment of diseases of the nasal duct. *Trans. Colo. Ophth. Congress*, 1915, p. 169.

(1) **Prince**, of Springfield, has devised an operation for draining the lacrymal sac into the middle meatus which the ophthalmologist can perform without the help of the rhinologist.

The steps of the operation are:—

1. Local anæsthesia to sac and corresponding area in nose.
2. Open the punctum and pass a canalicular knife into the sac.
3. Pass a lacrymal grooved director through the sac and into the nasal canal.
4. Direct the groove of the director toward the nose and slit the approach to the sac by passing a cataract knife along the groove. Stretch this opening with the largest lacrymal probe in your possession.
5. It will now be found that a gouge, 4 mm. wide, can be readily passed to the bottom of the sac, and by pressing it toward the nose it will enter the middle meatus and can be readily seen from below.
6. Remove the gouge and introduce a strip of sheet lead, 30 mm. long, 4 mm. wide, and 1 mm. thick, with the point slightly tapered. While observing the end of the lead plate through the nose, withdraw it until it almost disappears, when it will be found that the nasal wall of the sac, together with the corresponding portion of the lacrymal bone, will rest on the extremity of the lead plate, and by grasping the end of this by means of an appropriate forceps, one will be able to remove the inner wall of the sac, the thin lacrymal bone and the end of the strip of lead at the same time, and establish permanent drainage. It is found unnecessary to remove any portion of the middle turbinal, for the opening is not obscured by the structure The most important feature of the operation is the manner of grasping the extremity of the lead plate.

The writer's special forceps, as well as his lacrymal grooved director and special gouge, are figured. J. JAMESON EVANS.

(2) As well known, **Moulton**, of Fort Smith, has for several years treated diseases of the nasal duct by means of styles made from the fuse-wire employed by electricians. The method is not designed to replace all others in dealing with the lacrymal sac: syringing and probing have a permanent place, and extirpation is by far the best procedure in certain cases. The intra-nasal operations may have a place in the future. Moulton devotes the present paper to showing how certain disabilities that have been alleged against the use of lead styles can be avoided. SYDNEY STEPHENSON.

XI.—REMEDIES.

(*Eighth Notice.*)

(1) **Gifford, H.**—The treatment of gonorrhœal ophthalmia. *Southwest Journal of Medicine and Surgery*, January, 1916.

(2) Heckel. Edward B.—Preliminary report of a new method of treating gonococcic purulent conjunctivitis by the exclusive use of iced normal salt solution. *Pennsylvania Medical Journal*, April, 1916.

(3) Jocqs, R.—On lacrymal tumour. (Sur la tumeur lacrymale.) *La Clinique Ophtalmologique*, 10 juin, 1916.

(4) Frogièr, Léon. On paraspecific serumtherapy by the buccal route in ocular infections. De la sérothérapie paraspécifique par voie buccale dans les infections oculaires.) *La Clinique Ophtalmologique*, 10 juin, 1916.

(5) Heckel, Edward B.—Epibulbar sarcoma. Report of a case with a new technic for use and treatment with Röntgen rays. Patient, treated in 1910, cured and remains so. *Annals of Ophthalmology*, July, 1916.

(6) Bissell, Elmer Jefferson.—The non-operative treatment of incipient cataract. *Ophthalmic Record*, July, 1916.

(7) Russ, Charles.—Gonorrhœa treated by electrolysis: results in 100 cases. *Practitioner*, September, 1916.

(1) **Gifford**, of Omaha, concludes his paper on the treatment of gonorrhœal ophthalmia with the following summary:

1. While mild applications are sufficient for the great majority of cases; if ulceration of the cornea occurs, or if the discharge persists in spite of other treatment, use silver nitrate up to 8 per cent. twice a day, using hooks to turn out the retrotarsal folds and protect the cornea.

2. Use fluoresceine every day.

3. Use prophylactic treatment before closing up an apparently well eye.

4. It is probable that with some form of protection for the cornea, either by Thiersch flaps or sliding conjunctival flaps, ulceration may be entirely prevented, and the disease much shortened by the vigorous use of strong remedies.

(2) In view of the natural vulnerability of the gonococcus when exposed to heat or cold, the fatal temperatures in each direction being respectively 32° Fahr. and 107° Fahr., **Heckel**, of Pittsburgh, determined to try the effect of treatment by cold only. He reports apparently only three cases, in one of which (the first one) 1 per cent. silver nitrate was instilled on two occasions. The second case had been under treatment before being seen by Heckel, while, in the third, iced salt solution was used to the exclusion of all other treatment. Flushing with about a quart of iced salt solution was carried out every six hours, and during the intervals continuous iced pads were employed. The first case was an adult, the other two were in infants. In the first and third cases the eyes returned to normal in four days. In the second case (the one which had had previous treatment), the cold treatment was "very effective."

The author made it plain, in the course of the discussion which followed the reading of his paper, that he was satisfied as to the diagnosis in these cases. The bacteriological examinations had been fully carried out by a skilled pathologist. It is to be presumed that the author will publish further cases as they occur.

ERNEST THOMSON.

(3) In this article, **Jocqs**, of Paris, finds fault with, and indeed grumbles [illegible] of [illegible], for publishing [illegible] on the treatment of peridacryocystitis without recognising the prior claims of Jocqs himself and others. The method concerned is that of incision of the pericystic pocket, and cauterization of its interior with 50 per cent. chloride of zinc

solution, without, so far as possible, interfering with the lacrymal sac itself. It seems that Jocqs first published his views on this subject in *La Clinique Ophtalmologique* in 1899. ERNEST THOMSON.

(4) The articles of Darier on the subject of paraspecific serumtherapy have already been noticed in the columns of THE OPHTHALMOSCOPE from time to time. **Frogièr,** the writer of the present article, is Darier's *chef de clinique*. He emphasizes the value of this method of treatment, and especially its use by the buccal route. In the ordinary way of injection, sera are apt to give rise to anaphylaxis, but when given by the mouth, their action, although considerably slower, is deprived by the digestive ferments of harmfulness in this respect. This has been proved over and over again. It is necessary, however, to administer considerable quantities of serum. "It has been proved experimentally and clinically," says the author, "that the (anti-diphtheritic) serum of Roux, taken by the mouth, causes exactly the same therapeutic effects as serumtherapy by the subcutaneous route; but it is essential that the serum be taken for several consecutive days at a dosage of at least 10 cc. in the twenty-four hours." As a matter of fact, the author orders it as follows:

Anti-diphtheritic serum	...	10 grammes.
Raspberry syrup ...	...	30 ,,
Water	...	100 ,,

A soup-spoonful to be taken every hour for three days, and every second hour for the following eight days at least.

Regarding the action of paraspecific serumtherapy, that is, the action for good of a particular serum, especially Roux anti-diphtheritic serum, against a different organism, we have in a previous number of THE OPHTHALMOSCOPE (Vol. IX, 1911, p. 73) given in full the dictum of Darier, which is quoted by Frogièr, and therefore need not repeat it.

It is, perhaps, advisable to repeat, what Darier has emphasized before, that one great value of this method is that it can be applied at once without waiting for a bacteriological diagnosis, and in addition to other methods of treatment. ERNEST THOMSON.

(5) **Heckel,** of Pittsburgh, believes that malignant growths about the eye should be treated without the knife, especially as a selective necrosis of malignant tissue may be brought about by Röntgen rays and radium emanations. Two cases of the kind, it is true, treated in accordance with the older *technique*, were not successful, but a wonderfully good result was obtained in one case by adopting another plan.—A man, aged 69 years, came for consultation in September, 1910, with the history that in the previous April a small mass had been removed from the temporal side of one eyeball. The growth speedily returned. A bilobed fleshy-looking mass, with enlarged vessels running to it, lay in the ocular conjunctiva on the outer side of the eyeball. A piece, excised for examination, was reported as spindle-celled sarcoma. The condition was treated with Röntgen rays. The globe was exposed by Heckel's fingers, and during the application of the rays, it was kept constantly moist by dropping normal saline over the cornea. The Röntgen rays were applied by means of a lead glass tube with a small flint glass window inserted in the wall, over which was fitted a speculum of lead glass, terminating in an orifice of about one-half inch in diameter. The opening of the speculum was so placed as to be within a centimetre or less of the neoplasm. The tube used was one capable of maintaining a vacuum during the treatment, which permitted the passage of a current of three-quarters to one milliampère. Exposures were from three to six minutes. They were made three times a week during October

November, and December, 1910, and three times a week during January, and once a week during February and March, 1911, when the affected eye presented a perfectly normal appearance. In May, 1911, a 1 mm. nodule had made its appearance at the sclero-corneal junction. This disappeared after the Röntgen rays had been applied on eighteen occasions.

SYDNEY STEPHENSON.

(6) According to **Bissell**, of Rochester, only a very small percentage of cataract cases ever develop sufficiently to call for surgical treatment, and yet medical therapy of the condition has received but scant consideration and its very efficacy has been doubted by many observers.

The author, following the example set by Lieut.-Colonel Smith, has treated such cases with sub-conjunctival injections of mercury cyanide, 1 to 4,000. Of 33 cases 12 have shown improvement of the opacity of the lens. Bissell has also used potassium iodide in the same way (as originally recommended by von Pflugk), and in 60 cases observed marked diminution of the opacity in 6 per cent., slight improvement in 25 per cent., and deterioration in 3 per cent. In incipient cataract cases it is important to prescribe glasses and systematically to exercise the accommodation.

There is, of course, no specific remedy for cataract. It is, therefore, necessary to try to correct any faults of diet, digestion, drinking, bathing, thinking, and exercise that may be present. In every instance a quantitative examination of the urine should be made, not only to determine where there is diabetes or any form of nephritis present, but also if there is renal insufficiency. According to the author, 51 different observers have reported 147 diabetic cataracts, cleared up by proper diabetic treatment.

Bissell has several times observed the clearing of cataract by reducing the amount in those who take salt to excess. SYDNEY STEPHENSON.

(7) **Russ**, of London, as well known, treats gonorrhœa, acute and chronic, by means of electrolysis. Among the cases mentioned in the present communication there is one of "ophthalmia." A rapid recovery of the eyes accompanied the urethral cure. SYDNEY STEPHENSON.

THE PASSING OF "THE OPHTHALMOSCOPE."

THE present is the last number of THE OPHTHALMOSCOPE. For fourteen years we have appeared month by month; have done our best to serve the interests of ophthalmology; and now, have the somewhat melancholy satisfaction of feeling that we are to be replaced by a periodical which we believe will be more widely representative of British interests, and will be in a position to command suffrages we have never done.

The new Company, THE BRITISH JOURNAL OF OPHTHALMOLOGY, LIMITED, has been formed with a capital of £5,000, the original shares in which can be held only by those of British parentage. The Directors include W. H. H. Jessop (Managing Director), Sir George Berry, Sir Anderson Critchett, J. Gray Clegg, W. Lang, F. Richardson Cross, J. H. Fisher, Leslie Paton (Treasurer), and J. B. Story.

The new Journal, as already announced in these columns, will appear in January, 1917, and will be published monthly. The subscription has been fixed at £1 11s. 6d. per annum. It will amalgamate the *Royal London Ophthalmic Hospital Reports* (1857), the *Ophthalmic Review* (1881), and THE OPHTHALMOSCOPE (1903). It will be the only periodical representative of British ophthalmology. Mr. Sydney Stephenson, of THE OPHTHALMOSCOPE, will act as Editor, and Mr. E. Erskine Henderson, of the *Ophthalmic Review*, as Sub-Editor. They will be assisted by a strong, representative, and influential editorial committee.

Those whose subscriptions to THE OPHTHALMOSCOPE do not terminate with the December (1916) issue, will continue to receive THE BRITISH JOURNAL OF OPHTHALMOLOGY for the term covered by their payments. It is to be hoped that those members whose subscriptions expire with this number will continue their subscription to the new Journal, THE BRITISH JOURNAL OF OPHTHALMOLOGY, the address of which is 24, Thayer Street, London, W.

Farewell!

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

To the Editor of THE OPHTHALMOSCOPE.

SIR,—In the current number of THE OPHTHALMOSCOPE there occurs an abstract of an article by Fromaget, entitled "Latent Nystagmus." When reading the journal in proof it occurred to me that I was familiar with a type of case where ophthalmic examination reveals nystagmus for the first time. Covering one eye in the act of examination starts the nystagmus. Strange to relate, one of these cases which I had in mind appeared on the following day, thus confirming the belief that such cases were familiar.

J. M., aged 9 years, was first seen in March, 1916. The vision with the R.E. was 6/18 of the L.E. 6/18. Convergent squint of the right eye. This boy had slight nystagmus on ordinary observation, but it became very much worse on using the ophthalmoscope. Then the fact emerged that under a cylindrical correction the vision of each eye separately was R. not improved, L. 6/12; yet binocularly vision rose to 6/6. Now, eight months later, the vision unaided is R. 6/12, L. 6/9, but binocularly 6/6 full. By using a cover on one eye it is found that a marked rapid nystagmus with one eye covered changed to a scarcely noticeable movement with both eyes uncovered, with corresponding improvement in vision. A correction had been ordered at the first visit, but it had not been worn.

My impression is that I have seen other similar cases where nystagmus appeared either in both eyes, or only in one, on using the ophthalmoscope, but I cannot at the moment lay hands on the records.

Yours truly,

ERNEST THOMSON.

GLASGOW,
November, 1916.

BOOK NOTICES.

Refraction of the Human Eye and Methods of estimating the Refraction. By JAMES THORINGTON. London: William Heinemann (Rebman, Limited). 1916. Price, 10s. 6d. net.

Thorington is favourably known to the medical profession for his writings on refraction and allied subjects, and in the present volume has amalgamated his "Refraction and How to Refract," "Prisms," and "Retinoscopy" into one handy work, issued at a moderate price. The result is a book essentially suited to the requirements of beginners in ophthalmology, especially to those whose knowledge of mathematics is limited. A useful section on the fitting of spectacles adds to the value of the volume, which includes no fewer than 344 illustrations, of which 27 are coloured. It is concisely and carefully written. Altogether, it is one of the best books of its kind available for students and practitioners.

Thorington pays some considerable attention to retinoscopy without a cycloplegic. He holds that cases of myopia and mixed astigmatism with large pupils can be quickly and accurately corrected by the plan, yet two reasons prevent its general adoption. They are first, that such patients are not seriously inconvenienced (like hyperopes) by the blurred vision incident to the use of a cycloplegic; and, secondly, that distinct benefit follows the employment of a cycloplegic in those conditions. He suggests that individuals of fifty years of age and upwards may be quickly refracted after dilatation of the pupils by a 4 per cent. solution of cocaine. Chapter XXI (not XX, as stated in the preface) is devoted to an account of the combined retinoscopy and fogging method, which appears to be useful in certain cases.

Some useful hints are given in the section dealing with cycloplegics. One should never employ such agents in the eyes of nursing women, since they are very susceptible to the action of those drugs, which may, moreover, diminish the mammary secretion. In the case of young children, one drop of a 1 per cent. solution of atropine is used, and in an hour's time it is found by experience that the ciliary muscle is entirely relaxed. As to the use of homatropine, the author's plan is somewhat more complicated than that usually adopted in this country. He prescribes a solution which contains one grain of the hydrobromate salt to forty drops of water. One drop of this liquid is placed in each eye at bedtime, and next morning one drop is used every hour from the time of rising to the moment of leaving for the oculist's house. Once in the consulting room, a drop is put into each eye about every five minutes until six drops have been used. Then, after waiting for half an hour, the refraction is estimated. It does not appear that the author employs any test to determine whether full cycloplegia has been attained. The plan more customary in this country, called by the author the "forcing" method, does not appeal to Thorington. Whenever homatropine has been used, its mydriatic effect should be neutralised by a weak solution of physostigmine (gr. 1 to 1 ounce). It would be worth while enquiring whether the effect of the miotic is more than merely temporary in such cases.

The author speaks in terms of high praise of the electric or "luminous" ophthalmoscope, as he calls it. He cautions his readers, however, that when searching for vitreous opacities, or when estimating depressions or elevations in the fundus, it is preferable to use gas illumination. The reason for this is that the bright electric light penetrates deeply, and tends to render the estimate of elevations less and of depressions greater than they really are.

SYDNEY STEPHENSON.

Report of the National Physical Laboratory, 1915-16.

The Annual Report of the National Physical Laboratory is naturally affected by the war. The Laboratory has been almost entirely employed in special investigations undertaken for Government departments, and in the testing of different service instruments. There has been a reduction in the amount of secular test work, and a considerable part of the ordinary research work has been in abeyance.

In the optics division a number of special questions have been investigated, and some useful papers have been contributed by members of the staff to the Physical Society, the Optical Society, and other bodies. A grant was made by the Privy Council Committee for research in optical glass. The subject is of immediate importance in its relation to the war. Good progress has been made in the research, and there is a promise of its rigorous prosecution.

At the request of the Rœntgen Society, arrangements are being made for the examination of materials employed for the protection of X-ray workers.

NOTES AND ECHOES.

Deaths.

As already announced in these columns, our gallant *confrère*, Arthur Nimmo Walker, Lieutenant-Colonel, R.A.M.C., was killed in action at the front on September 24th last.

The deceased officer was the second son of the late George Edward Walker, the Liverpool ophthalmic surgeon, and the founder of St. Paul's Eye and Ear Hospital nearly fifty years ago. He was educated at the Liverpool College, and afterwards at Queen's College, Cambridge. After serving in the Boer War with the R.A.M.C., he joined the Territorial Army, and was appointed to the command of a battery of the 1st West Lancashire Artillery, and he continued to serve with his battery at Sevenoaks for about a year after the outbreak of hostilities. An urgent call for army surgeons was then made, and Walker responded by transferring his services to the R.A.M.C. He was sent to France in August, 1915. The following is an extract from a letter written to Mrs. George Walker, his mother, by the Chaplain after his death.—" His first thought was for his men ; indeed it was through his thoughtfulness for his officers and men that he met his death, for when the shelling began he stood and ordered all his men under cover, and would not move until he saw that all were safe first ; a true and fearless soldier, standing by his post to the last." Shortly before his death, Walker had been recommended for the D.S.O.

Walker's life-work, like that of his father before him, centred around St. Paul's Hospital. Owing to his energy, he got the institution rebuilt, and converted it from an institution for eyes and ears into one for eyes, pure and simple. But that was not his greatest achievement. To the great benefit of the poor of Liverpool, he instituted wards to accommodate babies suffering from ophthalmia, together with their mothers, thereby setting an example that might well be followed by other large towns. He was deeply interested in every aspect of ophthalmia neonatorum, and established the closest relationship between his hospital and the City Health Authorities, with a view both to preventing the disease and to curing it when it had once declared itself. Among the appointments held by Walker was that of surgeon to St. Paul's Eye Hospital, ophthalmic surgeon to the David Lewis Northern Hospital, surgeon to the School for the Indigent Blind, and assistant lecturer in anatomy in the University of Liverpool.

We offer our deep sympathies to Mrs. George Walker, his mother.

The death is announced from New York of Julius Hayden Woodward, at the age of 58 years. Deceased was director of instruction in the eye department of the Post-Graduate Hospital Medical School.

The following American ophthalmologists have also joined the great majority:—

Charles F. Nolen, of Baltimore, aged 47 years.

Benjamin Wolff, of New York, aged 42 years.

John J. Corrigan, of Pawtucket, aged 59 years.

Henry Horlbeck, of Columbia, S.C., aged 43 years.

Miles C. Dunn, of Henderson, Ky., aged 52 years.

George F. Clark, of Winchester, Ky., aged 47 years.

H. D. Baker, of Springfield, Mo.

* * *

The late Sir Henry Swanzy.

THE memorial to the late Sir Henry R. Swanzy, at the Royal Victoria Eye and Ear Hospital, Dublin, was unveiled on October 17th by His Grace the Archbishop of Dublin.

What does it mean?

THE following severe criticism of men and manners is taken from an article in an American ophthalmic journal regarding the meeting of the American Medical Association held at Detroit this year. "The medical profession at Detroit spared no effort or expense, particularly the latter, to make each visiting member welcome. . . . . . The social features were particularly elaborate and numerous, every effort being made to entertain the wives and families of the members. That some imposed upon and violated the hospitality of their Detroit *confrères* cannot be denied. For those we have regrets and offer apologies. The instances were few in number. It is to be hoped that no ophthalmologist so far forgot himself as to deviate from the accepted practices of gentlemen, like unto those of certain others, the actions of whom came to the attention of the writer." One cannot help wondering what it is all about.

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The Case of Optoquin.

The Prescriber for October has these hard things to say about optoquin, a drug with which ophthalmologists are more or less familiar.—

"Much has been seen in medical literature during the past six months regarding a drug called 'optoquin.' This is a trade name for ethylhydrocupreine, a derivative of cupreine, one of the cinchona alkaloids. We have been carefully collecting this literature with a view to presentation to our readers, but a careful sifting of the various extracts reveals the fact that, with one exception, all favourable comments come from Germany. Observers in Britain and in America, with the one exception referred to, all report against it, and even one or two German observers say the same thing. It has no effect on pneumonia, it is frequently toxic, and it almost invariably has a deleterious effect on the eyes. The one favourable comment is sent us privately by an eye specialist in England who has used the powder, dusted into the eye, with success in pneumococcal eye infections. The exception in this case may be regarded as proving the rule, for it is hardly wise to use a drug which has given results so decidedly bad in the hands of others. We all know how German clinical reports regarding new drugs are usually engineered, and optoquin has all the appearance of being a case in point. Besides, the drug is a German product, British stocks are exhausted, and no manufacturer here thinks it worth his while to make it. It is unobtainable, therefore the less said about it the better."

THE OPHTHALMOSCOPE DIARY.

	1916.	
Midland Ophthalmological Society	December 5th.	Leicester.
American Academy of Ophthalmology and Oto-Laryngology.	December 11th, 12th, and 13th.	Memphis, Tenn.
	1917.	
Midland Ophthalmological Society	February 6th.	Birmingham.
Section of Ophthalmology, Royal Society of Medicine.	February 7th.	1, Wimpole Street, London, W.
Midland Ophthalmological Society	April 3rd.	Birmingham.
Ophthalmological Society U.K.	May 3rd, 4th, and 5th.	London.
Midland Ophthalmological Society	June 5th.	Oxford.
Section of Ophthalmology, Royal Society of Medicine.	June 13th.	1, Wimpole Street, London, W.

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